

Arlington Conservation Commission

Date: Thursday, December 17, 2020

Time: 7:30 PM

Location: Conducted by Remote Participation

Please note: The listing of matters are those reasonably anticipated which may be discussed at the meeting. Not all items listed may in fact be discussed and other items not listed may be brought up for discussion to the extent permitted by law.

Agenda

Administrative

a. In accordance with the Governor's Order Suspending Certain Provisions of the Open Meeting Law, G. L. c. 30A, § 20 relating to the COVID-19 emergency, the December 17, 2020 public meeting of the Arlington Conservation Commission shall be physically closed to the public to avoid group congregation. The meeting shall instead be held virtually using Zoom.

Topic: Conservation Commission Meeting

Time: December 17, 2020 07:30 PM Eastern Time (US and Canada)

Register in advance for this meeting:

https://town-arlington-ma-us.zoom.us/meeting/register/tJckcuqqqD8jEtXg0J0WxYf-2J2ul1OvaFue

Members of the public are strongly encouraged to send written comment regarding any of the hearings listed below to Conservation Agent Emily Sullivan at esullivan@town.arlington.ma.us.

Please read Governor Baker's Executive Order Suspending Certain Provision of Open Meeting Law for more information regarding virtual public hearings and meetings: https://www.mass.gov/doc/open-meeting-law-order-march-12-2020/download

- b. Review draft 12/03/2020 minutes.
- c. Water Bodies Working Group update.

2. Discussion

a. Thorndike Place Discussion

The Conservation Commission will review the 12/08/2020 ZBA hearing on Thorndike Place and discuss next steps.

3. Hearings

Notice of Intent

Notice of Intent: Arlington Reservoir Master Plan Phase 2, 210 Lowell Street MassDEP File #091-0327

7:45pm

This project consists of the second phase of implementation of the Arlington Reservoir Master Plan and includes the following activities: parking area and stormwater improvements; improvements to existing pathways to make them accessible under the Americans with Disabilities Act (ADA); renovation and addition of new recreational facilities; shoreline bank stabilization; and upland habitat restoration and invasive species removal. Proposed project work is within the 100-ft Wetlands Buffer and Inland Bank area of the Arlington Reservoir.

Notice of Intent

Deliberation

Notice of Intent: Department of Public Works, 51 Grove Street

MassDEP File #091-0326

8:30pm

This project proposes a new/renovated Municipal Facility to support the Department of Public Works (DPW), Inspectional Services Department (ISD), Facilities, and IT departments at 51 Grove Street. The proposed site includes the current 4.4-acre parcel, used by DPW / ISD, and an adjacent 1.4-acre portion of Town-owned land for a total of 5.8 acres. Sections of the site are within the 100-ft Wetlands Buffer, AURA, and 200-ft Riverfront Area of Mill Brook, as well as floodway and floodplain. This proposal was initially presented to the Commission at its 11/05/2020 meeting and was continued to 12/03/2020. The public hearing for this project was closed on 12/03/2020. During this meeting, the Commission will deliberate a permit for the project.



Town of Arlington, Massachusetts

Thorndike Place Discussion

Summary:

Thorndike Place Discussion

8:45pm The Conservation Commission will review the 12/08/2020 ZBA hearing on Thorndike Place and discuss next steps.

ATTACHMENTS:

A: :	ACTIMIENTO.		
	Type	File Name	Description
ם	Reference Material	ZBA_TransmittalSupplemental_ApplicationMaterials_2020-11-03.pdf	Thorndike Place Revised Comprehensive Permit Application Transmittal Sheet 11032020
ם	Reference Material	Thorndike_Place_Waiver_Request_11032020.pdf	Thorndike Place Waiver Request 11032020
ם	Reference Material	Report_on_Existing_Site_Conditions_Nov.2020.pdf	Thorndike Place Existing Conditions Report 11032020
ם	Reference Material	Thorndike_Place_Plan_Set_Revised_11032020.pdf	Thorndike Place Revised Plan Set 11032020
ם	Reference Material	Thorndike_PlaceStormwater_Report_11032020.pdf	Thorndike Place Stormwater Report 11032020
ם	Reference Material	Thorndike_Place_Wildlife_Habitat_and_Vegetation_Evaluation_11032020.pdf	Thorndike Place Habitat and Wildlife Evaluation 11032020
ם	Reference Material	ZBA_TransmittalWetland_Delineation_2020-10-22.pdf	Thorndike Place Revised Wetlands Delineation Transmittal Sheet 10222020
ם	Reference Material	Thorndike_Place_Wetland_Delineation_Memo_REVISED_10-19-2020_gtd.pdf	Thorndike Place Revised Wetlands Delineation Memo 10192020
ם	Reference Material	2340700-CONSTRAINTS_w_Updated_Wetlands.pdf	Thorndike Place Revised Wetlands Delineation 10222020
ם	Reference Material	Wetland_Delineation_Field_Data_Forms.pdf	Thorndike Place Revised Wetlands Delineation Field Data Sheets 10152020
ם	Reference Material	Thorndike_Place_Compliance_with_MP_HPP_OSRP_11032020.pdf	Thorndike Place Demonstration of Compliance with Local Plans 11032020
ם	Reference Material	Thorndike_Place_Architecture_Binder_110.pdf	Thorndike Place Architecture Binder 11032020
ם	Reference Material	2020-11-20_Thorndike_Place_Civil-Site_Review-FINAL.pdf	BETA Site Review 11202020
ם	Reference Material	ACC_Comment_Letter_to_ZBA_Thorndike_Place_20NOV2020.pdf	ACC Comment Letter 11202020
			Thorndike Place Legal
D	Reference Material	Ltr_ZBA_12_9_2020_SmolakVaughan.pdf	Counsel Letter 12092020_NEW
D	Reference Material	ACC_Comment_Letter_to_ZBA_Thorndike_Place_18DEC2020.pdf	ACC Comment Letter 12182020_NEW



Sent Via Email

November 3, 2020

Christian Klein, Chair Arlington Zoning Board of Appeals 51 Grove Street Arlington, MA 02476

RE: Thorndike Place

Supplemental Application Materials

Chairman Klein:

As identified in the Supplemental Response to Completeness Review Memo dated September 25, 2020, on behalf of the Applicant, BSC is submitting the following revised and supplemental Thorndike Place Comprehensive Permit application materials for review in advance of the next scheduled public hearing on November 24, 2020:

- Report on Existing Conditions (Section 3.2.6 of Arlington Comprehensive Permit Regulations)
- Architectural Drawings
 - o 3D Perspective View (1 sheet)
 - Floor Plans (4 sheets) Garage, Ground Floor, Typical 2nd/3rd, and 4th Floor
 - Exterior Elevations (3 sheets) showing all building sides with Material Legend and Type of Construction
 - o Courtyard Section (1 sheet)
- Site Plans revised November 3, 2020 reflecting new building program presented at the October 13, 2020 public hearing
- Stormwater Report
- Wildlife Habitat and Vegetation Evaluation
- Updated waiver request list
- Statement of Compliance with Arlington's Master Plan, Housing Production Plan, and Open Space and Recreation Plan

Under separate cover, the Applicant is submitting the requested replenishment of the Peer Review Fees to Mary Musyznski, Department of Planning and Community Development as you have requested.

The above supplemental materials are provided in addition to the supplemental wetland delineation information provided on October 22, 2020 and as summarized below:

- Wetland Delineation Memorandum dated October 19, 2020
- MassDEP Bordering Vegetated Wetland Delineation Field Data Forms (5)
- Existing Environmental Resources Plan revised October 22, 2020

803 Summer Street Boston, MA 02127

Tel: 617-896-4300

www.bscgroup.com

Engineers

Environmental Scientists

Custom Software Developers

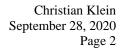
Landscape

Architects

Planners

Surveyors

4 of 842





This information is also being transmitted electronically to the Conservation Commission and BETA Group. Please let us know if any hard copies are required. Our team is available to meet with BETA Group to present the supplemental materials. Please me call at 781-710-7280 or email me at jhession@bscgroup.com if you have any questions or require additional information.

Very truly yours,

BSC Group, Inc.

John Hession, P.E.

Director of Land Development

cc: zba@town.arlington.ma.us

Richard Vallarelli, ZBA Emily Sullivan, Conservation

Susan Chapnick, Conservation Commission

Jenny Raitt, Planning and Community Development

Marta Nover and Todd Undzis, BETA Stephanie Kiefer, Smolak & Vaughan

Gwen Noyes and Arthur Klipfel, Arlington Land Realty

THORNDIKE PLACE List of Requested Waivers

As required under 760 CMR 56.05(2)(h), the following is a list of Waivers to "Local Requirements and Regulations," including waivers from the Bylaws of the Town of Arlington (the "Bylaws"), including the Town of Arlington Zoning Bylaw, as amended (the "Zoning Bylaw"), and other Local Requirements and Regulations as defined under 760 CMR 56.02 of the Chapter 40B Regulations, including all local legislative, regulatory, or other actions which are more restrictive than state requirements, if any, including local zoning and wetlands ordinances, subdivision and board of health rules, and other local ordinances, codes, and regulations, in each case which are in effect on the date of the Project's application to the Board. In addition to the following list of requested Waivers listed below, the Applicant requests an exception from such provision or requirement of all Local Requirements and Regulations issued by a "Local Board" (defined under the Chapter 40B Regulations as means any local board or official, including, but not limited to any board of survey; board of health; planning board; conservation commission; historical commission; water, sewer, or other commission or district; fire, police, traffic, or other department; building inspector or similar official or board; city council, as well as all boards, regardless of their geographical jurisdiction or their source of authority [that is, including boards created by special acts of the legislature or by other legislative action] if such local board perform functions usually performed by locally created boards).

Pursuant to Chapter 40B rules described under 760 CMR 56.05(7), "[z]oning waivers are required solely from the "as-of-right" requirements of a zoning district where the project is located; there shall be no requirement to obtain waivers from the special permit requirements of the district." Accordingly, any waivers which reference special permit requirements are included only for illustration purposes.

This waiver list continues to be preliminary and, as such, will be revised within the Public Hearing. Prior to the Board's vote on the Comprehensive Permit application, a final waiver list shall be submitted and reflect waivers consistent with plans as revised within hearing process.

LIST OF WAIVERS/EXCEPTIONS

A. BY-LAWS OF	A. BY-LAWS OF THE TOWN OF ARLINGTON, MASSACHUSETTS (GENERAL BYLAWS)						
BY-LAW/REG. TITLE		<u>DESCRIPTION</u>	REQUIRED	PROPOSED			
Title III: Article I,	Use of Streets for	Work adjacent to public ways	Application, permits from Board of	Waiver, except that Applicant			
Sections 1 and 2	Construction or	and use of ways to place	Public Works (or Town Engineer),	shall comply with all bonding			
	Demolition Materials	building materials or rubbish,	bond and bond requirements.	requirements.			
		and related application and					
		fee requirements.					
Title III: Article I,	Excavation in Streets	Work in public ways,	Application, permits and fee.	Waiver of permit and 25% of			
Section 20 and Sidewalks		excavation and related		fees.			
		application and fee					
		requirements					

Title V: Article 8	Wetland Protection	Local Matlanda Dulaur arad	Dunnadouran iomindiational	Mained as man be recessor.
and Town Wetland		Local Wetlands Bylaw and Related Regulations and Fees.	Procedures, jurisdictional	Waived as may be necessary
Protection	By-Law; Wetland Regulations of the	Related Regulations and Fees.	requirements, applications, fees, costs, regulations, policies, and	under Section 23; Section 24 and Section 25, Subpart D, to the
Regulations	Town of Arlington		enforcement, consultant fees.	extent that such may differ from
Regulations	Conservation		emoreement, consultant rees.	Wetlands Protection Act
	Commission (dated			requirements Project to be
	June 4, 2015)			governed by a Wetlands Order of
	, ,,			Conditions issued pursuant to the
				Massachusetts Wetlands
				Protection Act (MGL c. 131, s. 40)
				and State Wetlands Regulations
				at 310 CMR 10.00
			Section 23: Subpart C: No activity within bordering land subject to flooding without written permission of Commission Subpart D: Compensatory flood storage to be at 2:1 ratio.	Floodplain compensatory storage to be established at ratio of 2:1 – No waiver
			Section 24: Provides vegetation in a resource area shall not be damaged, removed, extensively pruned without written approval and in-kind replacement.	Replacement vegetation to be governed by landscaping plan included with Site Plans and governed by Comprehensive Permit.
			Section 25, Subpart D – work in outer 75 feet of AURA (Restricted Zone) to be subject to alternatives analysis.	As depicted on Site Plans, small portion of exterior emergency access and limited area of subsurface parking within limited portion of outer AURA Waiver as to alternatives analysis.
Title V; Article 8,	Wetlands Consultant	Consultant Fees		Waived
Section 16.B.11	Fees			

				Thorname Trace (Thington)
Title V: Article 15,	Stormwater	Stormwater Management and	Procedures, applications,	Waived Stormwater will be
Section 1-5	Mitigation	permitting	Engineering Division review and	managed in accordance with the
			approval, relief from DPW	MassDEP's Stormwater Policy
				and Technical Guidance, unless
				otherwise exempt. Stormwater
				to also be managed in
				accordance with a US EPA
				Stormwater Construction Permit
				for Massachusetts.
Title IX: Article 3,	Town Fees and	Fees and charges.	Payment of fees related to fire	Waiver allowing for 25%
Sections 4A, 4B	Charges, Department		safety, building permits, plan	reduction of fees (reflecting 25%
	of Community Safety		reviews, occupancy permits,	of project as affordable).
	and Office of Building		plumbing permit, gas fitting,	
	Inspector.		electrical	
Water Connection	Water Privilege Fee	Fee for water connections		Waiver requested of 25% of fee
Fee Regulations				(reflecting 25% of project as
				affordable).
Sewer Privilege Fee	Sewer Privilege Fee	Fee for connection to public		Waiver requested of 25% of fee
		sewer system		(reflecting 25% of project as
				affordable).

B. TOWN OF A	B. TOWN OF ARLINGTON ZONING BYLAWS (AS AMENDED THROUGH APRIL 2015)						
BY-LAW/REG.	<u>TITLE</u>	<u>DESCRIPTION</u>	REQUIRED	PROPOSED			
Article 2	Definitions	Various definitions.	Various definitions applying to provisions under bylaws.	Waived in its entirety to the extent definitions vary and/or conflict with MGL c. 40B and the Site Plans.			
Article 4.02	Application	Application of Zoning Bylaw	Except as herein provided, provisions of the [Zoning] Bylaw shall apply to the erection, construction, reconstruction, alteration or use of buildings, structures, use of land.	Waived; erection and construction of multifamily residential dwelling together with accessory uses thereto, including without limitation accessory parking (surface and underground), play area, terraces, landscaping and management office to be governed by Comprehensive Permit Decision.			
Article 5, Sec. 5.01	Use Regulations	Applicability	Buildings, structures or land shall be used only as set forth in Article 5.	Waived so that the use of buildings, structures or land for multifamily residential dwelling and accessory uses thereto shall be used in accordance with Comprehensive Permit decision pursuant to G.L.c.40B.			
Article 5, Sections 5.03, 5.04	Use Regulations	Uses subject to other regulations and Table of Use Regulations	Table at Section 5.04 permits as of right uses for single-family detached and two family, duplex house. Other residential uses, including apartment house, permitted by special permit; requires special permit for other accessory use customarily incidental to a permitted principal use	Waived to allow 176-unit multifamily residential uses, open space and residential accessory uses (e.g., residential auto and bicycle parking, play area, terraces, landscaping, management office) and signage in PUD District, to be governed by Comprehensive Permit decision pursuant to G.L. c.40B.			

	TOWN OF ARLING	GTON ZONING BYLAWS (AS AME	NDED THROUGH APRIL 2015)	(cont.)
BY-LAW/REG.	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	PROPOSED
ARTICLE 6 -				
GENERAL				
REGULATIONS				
Article 6, Section	Dimensional and	Table of Dimensional and	Regulates minimum lot size,	Waived to allow Project to be
6.00 – Table of	Density Regulations	Density Regulations	frontage; maximum floor area;	constructed in accordance with
Dimensional and			maximum lot coverage; min. lot	dimensional requirements of
Density Regulations			area, lot depth (front, side and	zoning ordinance in PUD district
			rear); maximum heights, minimum	except as waived herein and
			landscaped areas and usable open	depicted on approved plans
			space.	described within Comprehensive
				Permit decision.

	TOWN OF ARLINGTON ZONING BYLAWS (AS AMENDED THROUGH APRIL 2015) (cont.)							
BY-LAW/REG.	<u>TITLE</u>	DESCRIPTION	REQUIRED	PROPOSED				
Article 6, Sections 6.01, 6.03(a) and Table of Dimensional and Density Regulations, generally and applicable to PUD District (p.61 of zoning bylaw), and Sections 6.13, 6.21, 6.28	General (Dimensional and Density) Regulations and Table; Reduced Height Limits in Height Buffer Area; Planned Unit Development Yards and Setbacks	Lot Areas and Separation of Lots; spacing of a residential building on the same lot with another principal building; in PUD district establishes a lower (40') building height on parts of lot within defined height area buffer, with greater height allowed by special permit; and sets out setbacks to street lines and front, rear, side lot lines	 PUD dimensional requirements: 200,000 min. lot size; .80 max FAR; Max height: 85' (Residential uses to be no more than 5 floors)' Minimum open space requirement in PUD of 10% landscaped and 10% usable; Front, Side Rear Yards – 25' setback. 	 Lot size = 769,359 SF – no waiver FAR = .25 – no waiver Height <85'/ 4 floors + garage. – no waiver 41.3% landscaped open space – no waiver 10.6% usable open space – no waiver First yard: 25' – no waiver Side yard: 36' – no waiver Rear yard – 20.5' – to be waived. 				
-	Buildings in Floodplains	Dimensional and density regulations together with additional regulations of Section 11.04	Includes regulations within Section 6 and Section 11.04	Waived to the extent not consistent with Site Plans				
Article 6, Section 6.10	Sale or Lease of Lots in a Planned Unit Development	Upon completion of environmental design review, tracts of land of at least 30,000 sf may be leased or sold for development in accordance with PUD site plan	Requires tracts within PUD development to have principal building, offstreet parking, open space or plaza as required as result of environmental design review under Section 11.06 of Bylaw.	Waiver of provisions, consistent with waiver of Section 11.06 environmental design review process; project to be governed by Comprehensive Permit decision and incorporated plans therein				

	TOWN OF ARLIN	GTON ZONING BYLAWS (AS AME	NDED THROUGH APRIL 2015)	(cont.)
BY-LAW/REG.	<u>TITLE</u>	DESCRIPTION	REQUIRED	PROPOSED
Article 6, Section 6.30	Open Space Regulations for Planned Unit Developments	Sets out minimum open space within PUD district for apartment uses	Minimum open space for apartments in PUD district is 10% landscaped/10% usable open space	41.3% landscaped open space – no waiver 10.6% usable open space – no waiver
ARTICLE 8 – OFF STREET PARKING AND LOADING				
Article 8, Section 8.12.a(3)	Parking/Loading space standards – Minimum access aisle widths	Establishes minimum aisle widths for off street parking spaces	Minimum 24' aisle width of 90 deg angle parking	No waiver
Article 8, Section 8.12(b)(3)	Parking/Loading space standards	Location of parking areas	Parking not to be within required front yard.	Waiver to allow for parking area off Dorothy Road as shown on Site Plans.
ARTICLE 10: ADMINISTRATION AND ENFORCEMENT				Waived. Project governed by Comprehensive Permit.
Article 10, Section 10.02	Permit Required	Permits issued only in compliance with zoning bylaw.	No permit shall be issued if the building, structure or lot as constructed or used would be in violation of any provision of the Bylaw	Waiver so that construction and use of buildings and land be in accordance with the Comprehensive Permit decision.
Article 10, Section 10.11	Special Permits	Special Permit process	Special Permit required under Bylaw for review by ZBA or ARB (under Section 11.06) to review applications for Special Permits, including set of findings at 10.11(a)(1) and includes a two- year time period to make use of special permit.	ZBA review to adhere to Chapter 40B and 760 CMR 56.00 review standards, provisions for lapse of permits and single board (ZBA) review for local permitting of Comprehensive Permit application.

	TOWN OF ARLING	GTON ZONING BYLAWS (AS AME	NDED THROUGH APRIL 2015)	(cont.)
BY-LAW/REG.	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>REQUIRED</u>	<u>PROPOSED</u>
Article 10, Section	Variances	Variance review process	ZBA is empowered to grant	Waiver; ZBA review to adhere to
10.12			variances of Bylaw in accordance	Chapter 40B and 760 CMR 56.00
			with Section 10 of Chapter 40A.	review standards and to issue
				waivers of local regulation,
				bylaws or rules.
ARTICLE 11				
SPECIAL REGULATIONS				
Article 11, Section	Floodplain District	Governing regulations and	Permit required for specific uses	Waiver for special permit
11.04(a)-(g)		special permit review by	and structures; seeks to require	process/environmental design
		ZBA/ARB	compliance with Sections 11.04	review and waiver of application
			and 11.05 of Bylaw and Wetlands	of local wetlands bylaw (Title 5 of
			Protection Bylaw (Title V, Art. 8 of	Article 8), rules or regulations and
			Town Bylaws), in addition to State	Section 11.05 of Zoning Bylaw.
			Law (MGL 131, 40) and State	Project to be governed by
			Regulations (310 CR 10.00) and	Comprehensive Permit.
			State Building Code. Establishes	
			special permit process for new	
			buildings or earth movement in	
A 11 1 44 C 11			floodplain.	
Article 11, Section	Inland Wetland	Permit required for specific	Special Permit required for	To extent portions of property
11.05(b), (d), (e), (f)	District	uses and structures.	specific uses and structures.	are within district, waiver given as
				Project governed by
				Comprehensive Permit. (For
				informational purposes, per 40B
				waivers are not required for
				special permit uses).

	TOWN OF ARLINGTON ZONING BYLAWS (AS AMENDED THROUGH APRIL 2015) (cont.)						
BY-LAW/REG.	<u>TITLE</u>	<u>DESCRIPTION</u>	REQUIRED	PROPOSED			
Article 11, Section	Environmental	Environmental design review	Uses subject to Section 11.06(b)	Waiver of Environmental Design			
11.06(b), Section	Design Review	and standards for projects	may be allowed subject to special	Review (EDR), special permit			
11.06(d)(1), (4), (5),		including six or more dwelling	permit upon application to ARB to	application submittal, standards,			
(6), and 11.06(e)		units (11.06(b)(1)(b) or use	include materials set out in	and hearings before ARB. Waiver			
and 11.06(f)		within a PUD (Section	Section 11.06(d) as well as	to include waiver from adherence			
		11.06(b)(2).	certified land surveyor survey plan	to EDR submittal requirements of			
			of land and corner points of lot to	Section 11.06(d) and review			
			be marked by monument or other	standards of Section 11.06(e)/(f).			
			physical demarcation. Before	Applicant proposes to submit to			
			special permit to issue, public	ZBA within review of			
			hearing before ARB. Review	Comprehensive Permit			
			standards as contained in Section	application modeling for project;			
			11.06(f).	waiver of environmental impact			
				statement; waiver of sign			
				applications; signage to comply			
				with zoning bylaw and are to be			
				depicted on final approved site			
				plans, with exception of			
				temporary construction signage			
				as approved by Building Official			
				from time of commencement of			
				project to completion of			
				construction Project review to			
				be accordance with public			
				hearing process as established			
				under MGL c.40B and its			
				regulations at 760 CMR 56.00 et			
				seq.; project to be governed by			
				Comprehensive Permit decision.			

	TOWN OF ARLINGTON ZONING BYLAWS (AS AMENDED THROUGH APRIL 2015) (cont.)						
BY-LAW/REG. TITLE DESCRIPTION REQUIRED				PROPOSED			
Article 11, Section	Filling of Any Water	Filing submission	Conditions on filing requirements	Waiver to forego preparation of			
11.07	or Wet Area	requirements, review and	and fill standards/limits.	plans/documents for separate			
		standards within		review. To the extent project			
		Environmental Design Review		requires submission of Notice of			
		involving fill of water or wet		Intent under State WPA to the			
		areas of 500 cubic yards or		Arlington Conservation			
		greater or where area		Commission; standards and			
		involved is >10,000 sq. ft. and		criteria applicable are those			
		approved under State WPA		contained in State Act and its			
				regulations.			
Article 11, Section	Affordable Housing	Affordable housing	Requires 15% of new residential	Waiver to the extent Section			
11.08	Requirements	requirements for projects	units be Affordable Units (as	11.08 varies or is not consistent			
		including six or more	defined in Zoning Bylaw, Section	with Chapter 40B, its regulations			
		residential units under Section	11.08), or contribution to	and the rules and policies of			
		106	Affordable Housing Trust Fund, by	DHCD and MassHousing.			
			allowance of ARB	Applicant's project is subject to			
				affordable housing requirements			
				as contained in M.G.L. c.40B and			
				its regulations under the New			
				England Fund Program of Home			
				Loan Bank of Boston, in			
				accordance with Site Approval			
				given by MassHousing and			
				Regulatory Agreement approved			
				by the State.			

ZONIN	ZONING BOARD OF APPEALS OF TOWN OF ARLINGTON COMPREHENSIVE PERMIT REGULATIONS						
REGULATION	TITLE	DESCRIPTION	REQUIRED	<u>PROPOSED</u>			
Section 3.1, 3.2	Application and Documentation	Application contents	Complete application filed upon submittal of documentation of Section 3.0	Waiver of certain submission requirements beyond the requirements of 760 CMR 56.00 at time of initial filing; additional documentation to be submitted to Board within public hearing process and review by peer review consultants.			
Section 3.2.7	Preliminary Scaled Architectural Drawings	Preliminary Architectural	To be on scale of 1/8"=1"; include typical floor plans, typical elevations and sections; construction type and finish and signed by architect;	Waiver sought for scale of 1/8"= 1" for all architectural drawings, due to size of area plans scaled at 1/8" would be too large to be useful.			
Section 3.2.11	List of Requested Exemptions	Local Bylaw waivers	List of Exemptions to contain location on plan, complete explanation as to economic impact of local rule or regulation	Waiver sought to extent local regulation seeks "complete explanation as to economic impact," as such request is inconsistent with MGL c.40B/760 CMR 56.05(7) (waivers may be sought as consistent with local needs; where town has less than 10% affordable housing, presumption that affordable housing need outweighs local concerns.)			

	1	T		mornance race (rannigion)
Section 3.2.13	Impact Analysis of the	Impact analysis to be	Impact analysis by	Waiver for timing of filing
	Natural and Built	prepared by wetland	professional to assess	impact analysis at initial filing
	Environment	scientist, environmental	predevelopment	and to be supplemented to the
		scientist, hydrologist,	conditions and post-	Board within the public hearing
		professional engineer, soil	development impacts	process as reflected in 9/25/20
		scientist, botanist,	water quantity/quality;	Response Supplemental
		hydrogeologist or other	recharge, open	Completeness Review .
		scientific professional	space/recreational land;	
			wildlife habitat and	
			wetland resources;	
			species of special concern	
			and historic/ cultural	
			resources	
Section 3.2.15	Statement of Impact on	Applicant to provide impact	Detailed analyses of costs	Waiver of impact analysis at
	Municipal Facilities and	analysis	imposed on Town as well	initial filing; Applicant agrees to
	Services		as anticipated tax and	timely provide the same within
			other revenue to be	the public hearing process for
			generated	review by Board and its
				consultant, as project may be
				further refined within public
				hearing process and process as
				reflected in 9/25/20 Response
				to Supplemental Completeness
				Review.



To: Arlington Zoning Board of Appeals

Fr: Stephanie A. Kiefer, Esq.

Re: Narrative Report on Existing Site Condition - Thorndike Place

Date: November 3, 2020

The below narrative report on Existing Site Conditions supplements the Site Conditions Report (Part III) of Arlington Land Realty, LLC's Comprehensive Permit, previously filed with the Zoning Board on September 2, 2016. Under Section 3.2.6 of the Arlington Comprehensive Permit regulations, a report (together with applicable plans) is requested to describe existing site conditions, summarize conditions in the surrounding area, wetland or vernal pools, mature trees, existing street elevations, traffic patterns and character of open areas in the neighborhood.

A. <u>Site Location</u>

The Mugar property, approximately 17+ acres in size, is a largely forested site located in East Arlington, between Route 2/Concord Turnpike and residential neighborhoods to the north and east the and Thorndike athletic fields to the south. The locus is accessed via Dorothy Road, a 40-foot public way, as well as the intersecting Parker Street and Littlejohn Street. To the east, Edith Street and Burch Street access the site.

The locus is within Arlington's PUD zoning district, which zoning district specifically contemplates use of the land for larger scale developments, including higher density apartment house residential uses. The majority of the adjacent neighborhood, including abutting properties on Dorothy Road, Burch Street and Edith Street, is located in the R2 Two-Family zoning district. The portion of the neighborhood east of Littlejohn Street and north to Lake Street is within the R1 – Single-Family zoning district. Locations of existing structures and existing public roadways in the immediate vicinity of the Site are shown on the Existing Conditions Plan. There are no existing buildings located on the Mugar property.

The location of the property is well situated to both subway, bus and bike paths, to make the project a highly transit-friendly residential project. Likewise, given the size of the property, the property can support the proposed multifamily residential use while also allowing for a large portion of the site to be protected under a conservation restriction.

The MBTA Alewife Station is approximately .5 mile from the site; the Alewife station services the Red Line subway line as well as a number of MBTA bus routes, including Route 62, Route 67, Route 76, Route 79, Route 84, Route 350 and Route 351. Directly to the south of the property is Route 2/Concord Turnpike. Route 2 is classified by the MassDOT as a Principal

{00176276;v1} 18 of 842

Arterial under MassDOT jurisdiction. Route 2 connects various towns and major highways from the New York State line to Boston. Locally, Route 2 provides a connection between I-95/Route 128 to the west with Route 16 to the east.

B. Existing Conditions of the Site

The topography of the site is undulating with small to medium sized depressions in the northeasterly portion of the property. To the north, along Dorothy Road, site elevations range from 8 to 12 feet; and the frontage along Route 2/Concord Turnpike is generally between elevation 5 to 8 feet.

The property is largely forested, with extensive areas overrun with invasive species including Garlic Mustard, Japanese Knotweed, and Oriental Bittersweet. (*See* Wildlife Habitat and Vegetation Evaluation for a more detailed description of the existing vegetation). The soils onsite are generally decomposed organic material over loose sandy and gravelly glaciofluvial deposit. The property is presently undeveloped and overgrown, with makeshift homeless camps upon the site.

The Existing Conditions Plan (Sheet V-100) prepared by the BSC Group depicts the site location, the abutting properties, existing street elevations and other relevant information with respect to the existing condition of the property, including without limitation location of buildings on adjacent properties. Please also refer to the General Notes and Utility Note on the Existing Condition Plan for further information.

C. Character of Open Areas in Vicinity

The site is presently undeveloped. The immediate neighborhood to the north and east is densely residentially developed. To the west of the site are the Thorndike athletic fields.

As part of Applicant's proposal, only the northerly/northwesterly portion of the site is proposed for the multifamily housing project and its accessory driveway access, landscaping, play area, terraces and related infrastructure. The Applicant has proposed that the environmentally sensitive portions of the site be protected by a conservation restriction or other appropriate land conservation mechanism.

D. Locations of Wetland Resource Areas and Floodplain Features

A large portion of the site is located within floodplain area and Bordering Vegetated Wetland, located predominantly on the southerly side of the site, both of which are wetland resource areas under the State Wetlands Protection Act Regulations and the Arlington Wetlands Protection Bylaw. The 100-year floodplain is identified as elevation 6.8 and has been located on the Existing Conditions and Existing Environmental Resources Plans (Sheets V-100 and C-100 in the plan set). The wetlands were delineated by BSC Group in January 2020 and again in October 2020. The wetland resource areas are shown on the Existing Environmental Resources

{00176276;v1} 19 of 842

Plan (Sheet C-100 in the plan set) and as further documented in a Wetland Delineation Memorandum prepared by BSC Group dated October 19, 2020.

A review of the information available through MassGIS and the Natural Heritage and Endangered Species on-line data viewer determined no presence of estimated or priority habitat area, vernal pools, or any other similar jurisdictional resource area (*See* Wildlife Habitat and Vegetation Evaluation for a more detailed description of the existing wildlife).

The Existing Environmental Resources Plan (Sheet C-100) shows the locations of wetland resource areas and floodplain as surveyed and delineated by the BSC Group. The wetland resource areas are also further detailed in the BSC Group Wetlands Delineation Memorandum, dated October 19, 2020. A copy of the October 19, 2020 memorandum was previously submitted to the Board on October 22, 2020. The BSC memorandum describes both the state and locally regulated wetland resource areas and buffer zones and floodplain areas. As detailed therein, BSC delineated and flagged four Bordering Vegetated Wetland ("BVW") mapped areas, BVW Series A-D. BVW Series A and D are predominantly forested areas; BVW Series B is primarily forested with an area of herbaceous cover and BVW Series C is largely herabeous cover (common reed) with some forested area. According to BSC's observations, only a small isolated area to the west of an area previously flagged as Wetland I on the north side of the site demonstrated hydric soils. The BSC memorandum also identifies the tree species located on the property as well as the shrub and sapling species, herbaceous species and vines. As documented by BSC's field investigations, the upland areas, the tree population includes red oak, white pine, cottonwood, box elder and red maple

Further, please refer to the Wildlife Habitat and Vegetation Evaluation report submitted herewith for further detailed information on the existing vegetation, wildlife and documented conditions on the property. The Wildlife Habitat and Vegetation report documents a number of mature trees in the study areas, but has not conducted a full tree survey within the heavily wooded site.

E. Traffic and Parking

The Thorndike Place 40B project is designed to leverage its proximity to a major bike path (Minuteman Bike Path) as well as nearby transportation facilities to encourage multi-modal travel. Primary access to the 176-unit multifamily project will be at the corner of the Dorothy Road/Littlejohn Street. The detailed updated traffic impact report is being submitted to the Board under separate cover by Vanasse & Associates, which will detail the existing traffic patterns together with an analysis of the traffic presently existing and as impacted by the 40B project.

The Arlington Zoning Ordinance requires one parking space per studio apartment, 1.15 spaces per one-bedroom unit, 1.5 spaces per two-bedroom unit and 2.0 spaces per three-bedroom unit in an apartment house. The Project includes a total of 240 parking spaces in accordance with the zoning requirements, or an average of 1.36 spaces per unit which is a parking space per unit ratio generally consistent with projects of this nature. The Project also includes approximately 140 bicycle parking spaces.

{00176276;v1} 20 of 842

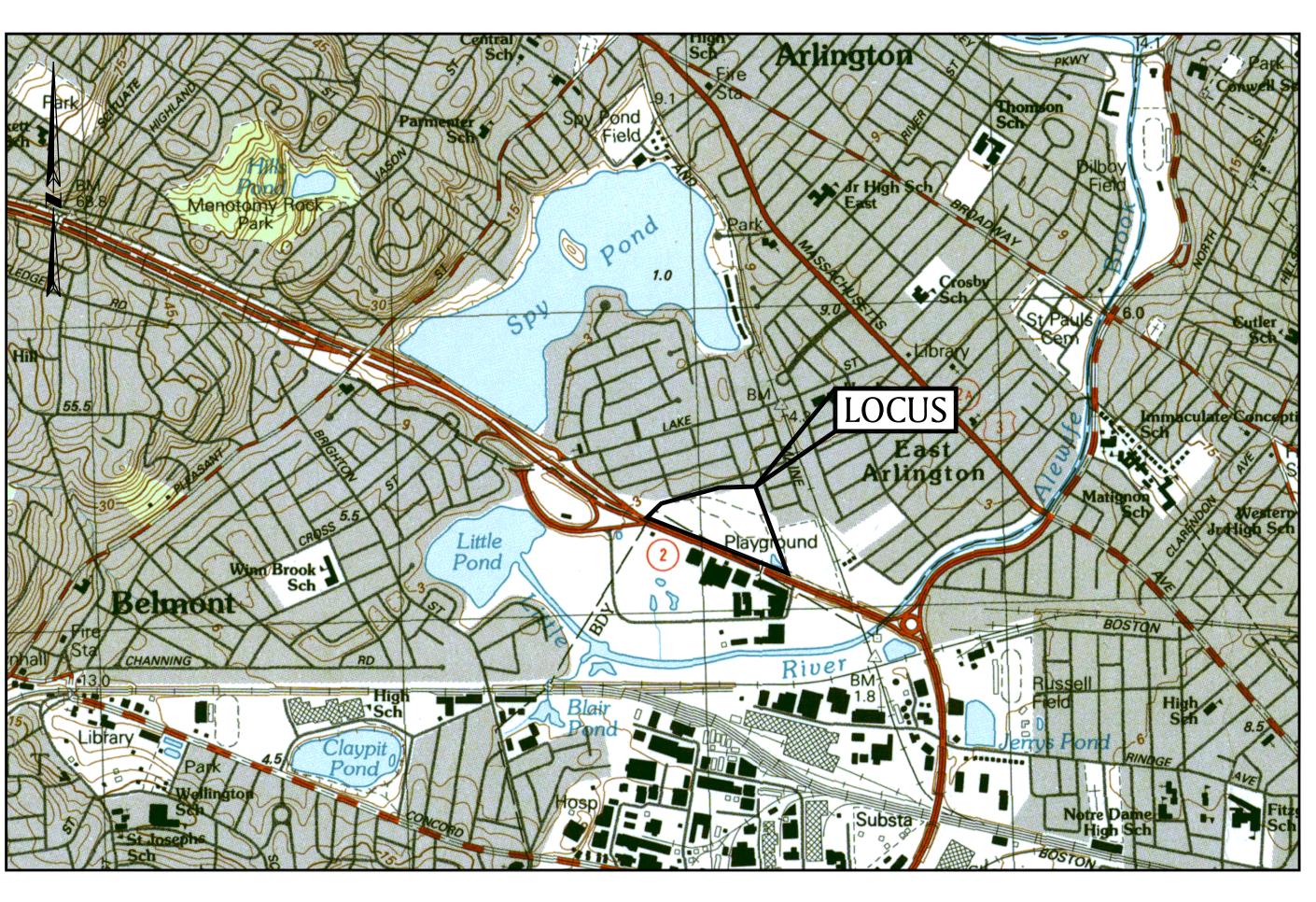
{00176276;v1} 21 of 842

THORNDIKE PLACE COMPREHENSIVE PERMIT

DOROTHY ROAD ARLINGTON, MASSACHUSETTS

MARCH 13, 2020

REVISED: NOVEMBER 3, 2020



INDEX OF DRAWINGS

G-100 TITLE SHEET

G-101 GENERAL NOTES & LEGEND

V-100 EXISTING CONDITIONS PLAN

C-100 EXISTING ENVIRONMENTAL

RESOURCE PLAN

C-101 SITE PREPARATION PLAN

C-102 OVERALL SITE PLAN

C-103 LAYOUT & MATERIALS PLAN

C-104 GARAGE LEVEL PLAN

C-105 GRADING & DRAINAGE PLAN

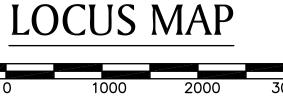
C-106 UTILITY PLAN

L-100 PLANTING PLAN

C-200-203 CIVIL & LANDSCAPE DETAILS

PREPARED FOR:

ARLINGTON LAND REALTY, LLC 84 SHERMAN STREET, 2ND FLOOR CAMBRIDGE, MA 02140



SCALE: $1" = 1000 \pm$



PREPARED BY:



617 896 4300

ISSUED FOR PERMITTING NOT FOR CONSTRUCTION

JOB NO: 23407.00 DWG NO: G-100

GENERAL NOTES

- 1. EXISTING CONDITIONS SURVEY INFORMATION WAS PREPARED BY BSC GROUP, INC. SURVEY IS BASED ON AN ON-THE-GROUND SURVEY CONDUCTED BY BSC GROUP IN DECEMBER 2019-FEBRUARY 2020.
- 2. REVIEW ALL EXISTING CONDITIONS IN THE FIELD AND REPORT ANY DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE OWNER'S REPRESENTATIVE PRIOR TO STARTING WORK.
- 3. THE LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED ON THE SURVEY REFERENCED ABOVE. THE CONTRACTOR SHALL CONTACT DIGSAFE AND THE PROPER LOCAL AUTHORITIES OR RESPECTIVE UTILITY COMPANIES TO CONFIRM THE LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. ANY DAMAGE DUE TO FAILURE OF THE CONTRACTOR TO CONTACT THE PROPER AUTHORITIES SHALL BE BORNE BY THE CONTRACTOR.
- 4. ANY DISCREPANCIES BETWEEN DRAWINGS, SPECIFICATIONS, AND SITE CONDITIONS SHALL BE REPORTED IMMEDIATELY TO THE CONTRACTOR/ENGINEER FOR CLARIFICATION AND RESOLUTION PRIOR TO BIDDING OR CONSTRUCTION.

SITE PREPARATION NOTES

- AREAS DESIGNATED FOR CLEARING SHALL BE CLEARED ONLY.
- 2. THE SUBCONTRACTOR(S) IS/ARE RESPONSIBLE FOR ANY DAMAGE TO EXISTING CONDITIONS TO REMAIN THAT ARE DUE TO SUBCONTRACTOR(S) OPERATIONS.
- 3. ITEMS TO BE REMOVED THAT ARE NOT STOCKPILED FOR LATER REUSE ON THE PROJECT OR DELIVERED TO THE OWNER SHALL BE LEGALLY DISPOSED OF OFF SITE BY THE SUBCONTRACTOR(S).
- THE SUBCONTRACTOR(S) SHALL BE RESPONSIBLE FOR COORDINATING THEIR EFFORTS WITH ALL TRADES.
 THE CONTRACTOR SHALL COORDINATE ALL ADJUSTMENT OR ABANDONMENT OF UTILITIES WITH THE RESPECTIVE
- UTILITY COMPANY.

 6. THE SUBCONTRACTOR(S) SHALL MAINTAIN OR ADJUST TO NEW FINISH GRADE AS NECESSARY ALL UTILITY AND SITE STRUCTURES SUCH AS LIGHT POLES, SIGN POLES, MAN HOLES, CATCH BASINS, HAND HOLES, WATER AND GAS GATES, HYDRANTS, ETC., FROM MAINTAINED UTILITY AND SITE SYSTEMS UNLESS OTHERWISE NOTED OR
- 7. TEMPORARY CONSTRUCTION HAUL ROADS (IF REQUIRED) SHALL BE EXCAVATED AND THE SUB-BASE COMPACTED TO 95% SPMDD. THE USE OF SEPARATION FABRICS MAY BE USED TO FACILITATE FUTURE REMOVAL AND RECOVERY OF GRANULAR MATERIALS. HAUL ROAD SHALL HAVE AT LEAST 9" OF 6-INCH MINUS STONE AND SHALL BE MAINTAINED DURING CONSTRUCTION.

EROSION AND SEDIMENT CONTROL MEASURES

DIRECTED BY THE CONTRACTOR/ENGINEER.

- 1. EROSION CONTROL SHALL BE PROVIDED IN ACCORDANCE WITH THE SEQUENCE OF STAGED CONSTRUCTION. THE CONTRACTOR SHALL SUBMIT A DETAILED EROSION CONTROL PLAN INCLUDING SCHEDULE FOR APPROVAL BY THE TOWN OF ARLINGTON. A COPY OF THE APPROVED NPDES EROSION AND SEDIMENT CONTROL PLAN SHALL BE MAINTAINED ON THE SITE.
- 2. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY SITE EXCAVATION OR DISTURBANCE AND SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PROCESS. THE SMALLEST PRACTICAL AREA OF LAND SHALL BE EXPOSED AT ANY ONE TIME.
- 3. SEDIMENT TRAPS SHALL BE INSTALLED AT DRAINAGE STRUCTURES IN PUBLIC STREET IN THE PROJECT AREA. STRAW BALE BARRIERS AND SILTATION FENCES ARE TO BE MAINTAINED AND CLEANED UNTIL ALL SLOPES HAVE BEEN STABILIZED.
- 4. SEDIMENT BARRIERS SHALL BE INSPECTED AND APPROVED BY THE TOWN OF ARLINGTON BEFORE CONSTRUCTION CAN START.
- 5. STRAW BALES AND MULCH SHALL BE MOWINGS OF ACCEPTABLE HERBACEOUS GROWTH, FREE OF NOXIOUS WEEDS OR WOODY STEMS, AND SHALL BE DRY WHEN INSTALLED.
- 6. THE UNDERSIDE OF STRAW BALES SHOULD BE KEPT IN CLOSE CONTACT (TRENCHED IN 3-INCHES MINIMUM) WITH THE EARTH AND RESET AS NECESSARY.
- 7. DISTURBED AREAS SHALL BE BLANKETED OR SEEDED AND MULCHED AS SOON AS PRACTICAL AFTER CONSTRUCTION ACTIVITIES IN THAT AREA HAVE CONCLUDED. ALL ERODABLE/BARE AREAS SHALL BE BLANKETED
- OR SEEDED AND MULCHED WITHIN 7 DAYS WITH TEMPORARY EROSION CONTROL SEEDING.

 8. STABILIZE SLOPES GREATER THAN 3:1 (HORIZONTAL: VERTICAL) WITH SEED, SECURED GEOTEXTILE FABRIC,
- SPRAYED COMPOST BLANKET, OR RIP-RAP AS REQUIRED TO PREVENT EROSION DURING CONSTRUCTION.
- SEDIMENT BARRIERS SHALL BE CONSTRUCTED AROUND ALL SOIL STOCKPILE AREAS.
 CLEAN OUT DRAINAGE FEATURES AND STRUCTURES AFTER COMPLETION OF CONSTRUCTION.
- 11. SEDIMENT COLLECTED DURING CONSTRUCTION BY THE VARIOUS TEMPORARY EROSION CONTROL SYSTEMS SHALL BE DISPOSED OF ON THE SITE ON A REGULAR BASIS. SEDIMENT SHALL BE REMOVED FROM EROSION CONTROL SYSTEMS WHEN THE HEIGHT OF THE SEDIMENT EXCEEDS ONE—HALF OF THE HEIGHT OF THE SEDIMENT
- CONTROL MEASURE.

 12. AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE SUBCONTRACTOR(S) SHALL REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AT THE CONTRACTOR/ENGINEER DIRECTION.
- 13. AFTER THE REMOVAL OF TEMPORARY EROSION CONTROL MEASURES, THE SUBCONTRACTOR(S) SHALL GRADE AND SEED AREA OF TEMPORARY EROSION CONTROL MEASURE.
- 14. DAMAGED OR DETERIORATED ITEMS WILL BE REPAIRED IMMEDIATELY AFTER IDENTIFICATION OR AS DIRECTED BY THE CONTRACTOR/ENGINEER.
- 15. THE CONTRACTOR'S SITE SUPERINTENDENT WILL BE RESPONSIBLE FOR DAILY INSPECTIONS, MAINTENANCE, AND REPAIR ACTIVITIES. THE CONTRACTOR SHALL INSPECT EROSION CONTROL MEASURES EVERY SEVEN (7) CALENDAR DAYS OR ONCE EVERY FOURTEEN (14) DAYS AND WITHIN 24 HOURS OF ANY STORM EXCEEDING 1/2 INCH PRECIPITATION. DAMAGED AND INEFFECTIVE EROSION CONTROL MEASURES SHALL BE REPAIRED OR REPLACED WITHIN 48 HOURS.
- 16. PIPE OUTLETS (IF ANY) SHALL BE STABILIZED WITH STONE.
- 17. TEMPORARY SEEDING SHALL BE AT A RATE OF 45 LBS PER ACRE. ERODABLE AREAS OUTSIDE AND DOWN SLOPE FROM THE CONSTRUCTION LIMITS SHALL BE SIMILARLY SEEDED.
- 18. WATER PUMPED OR OTHERWISE DISCHARGED FROM THE SITE DURING CONSTRUCTION DEWATERING SHALL BE

FILTERED. DEWATERING PLAN SHALL BE SUBMITTED FOR APPROVAL BY THE ENGINEER.

- 19. WHEN TEMPORARY DRAINAGE IS ESTABLISHED, EROSION/SEDIMENTATION CONTROL MEASURES MAY BE REQUIRED
- BY CONTRACTOR/ENGINEER.

 20. GRAVEL CONSTRUCTION ROADS AND CONSTRUCTION PARKING AREAS OF SUFFICIENT WIDTH AND LENGTH, AND VEHICLE WASH DOWN FACILITIES, SHALL BE PROVIDED TO PREVENT SOIL FROM BEING TRACKED ONTO PUBLIC OR PRIVATE ROADWAYS. ANY SOIL REACHING A PUBLIC OR PRIVATE ROADWAY SHALL BE REMOVED BEFORE THE END OF EACH WORKDAY AND AS NEEDED.
- 21. NECESSARY MEASURES SHALL BE TAKEN TO CONTAIN ANY FUEL OR POLLUTION RUNOFF. LEAKING EQUIPMENT OR SUPPLIES SHALL BE IMMEDIATELY REPAIRED OR REMOVED FROM THE SITE.
- 22. THE COST OF REPAIRING OR REMOVING SEDIMENT FROM EROSION CONTROL SYSTEMS SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE FOR THE APPLICABLE EROSION CONTROL ITEM.
- 23. ALL EROSION CONTROL MEASURES SHALL BE KEPT OPERATIONAL AND MAINTAINED CONTINUOUSLY THROUGHOUT THE PERIOD OF LAND DISTURBANCE UNTIL PERMANENT SEDIMENT AND EROSION CONTROL MEASURES ARE OPERATIONAL. CONTRACTOR SHALL PROVIDE TO THE CONSERVATION COMMISSION MEASURES (EROSION AND SEDIMENTAITON CONTROL) FOR WORK DURING WINTER CONDITIONS.
- 24. CONTRACTOR SHALL SPRAY WATER FROM A WATER TRUCK ON DRY AND WINDY DAYS TO PREVENT DUST FROM FORMING.
- 25. EROSION CONTROL MEASURES AS SHOWN ON THESE DRAWINGS IS INTENDED TO CONVEY MINIMUM REQUIREMENTS. THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL MEASURES AS NECESSARY TO PREVENT SOIL EROSION AND TO COMPLY WITH THE PROJECT'S STORMWATER POLLUTION PREVENTION PLAN.
- 26. SOILS ON SLOPES THAT ARE 3:1 OR STEEPER SHOULD BE ROUGHENED PER THE EPA'S NPDES SOIL ROUGHENING FACT SHEET IF THEY ARE TO BE SEEDED WITHIN 2 WEEKS OF DISTURBANCE. IF NOT, EROSION

CONTROL BLANKETS SHOULD BE INSTALLED ON THESE SLOPES.

LAYOUT AND MATERIAL NOTES

- THE FOLLOWING LAYOUT CRITERIA SHALL CONTROL UNLESS OTHERWISE NOTED ON THE PLAN:
 a. ALL TIES TO PROPERTY LINES ARE PERPENDICULAR TO THE PROPERTY LINE UNLESS OTHERWISE NOTED
 b. DISTANCES AND DIMENSIONS ARE IN DECIMAL FEET.
- SCREENED IMAGES SHOW EXISTING CONDITIONS. WHERE EXISTING CONDITIONS LIE UNDER OR ARE IMPINGED
 UPON BY PROPOSED BUILDINGS AND/OR SITE ELEMENTS, THE EXISTING CONDITION WILL BE REMOVED,
 ABANDONED AND/OR CAPPED OR DEMOLISHED AS REQUIRED. AMBIGUITIES IN THE PLANS SHALL BE CLARIFIED
 BY THE ENGINEER OR SITE SUPERINTENDENT.

GRADING AND UTILITY NOTES

- 1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE APPLICANT. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MAY BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UNDERGROUND UTILITIES.
- 2. THE PROJECT APPLICANT SHALL OBTAIN ALL NECESSARY STREET-OPENING PERMITS, WATER AND SEWER CONNECTION PERMITS AND PAY REQUIRED FEES PRIOR TO COMMENCING WORK ON THESE UTILITIES.
- 3. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY COORDINATION WITH THE TOWN OF ARLINGTON.
- 4. ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF ALL GAS, ELECTRIC, TELEPHONE, AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES SHALL BE MADE BY THE PROJECT APPLICANT.
- 5. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.
- 6. WHERE PROPOSED GRADES MEET EXISTING GRADES, SUBCONTRACTOR(S) SHALL BLEND GRADES TO PROVIDE A SMOOTH TRANSITION BETWEEN EXISTING AND NEW WORK. PONDING AT TRANSITION AREAS WILL NOT BE
- 7. POSITIVE DRAINAGE SHALL BE MAINTAINED AWAY FROM ALL STRUCTURES.
- 8. SUBCONTRACTOR(S) SHALL VERIFY EXISTING GRADES AND NOTIFY THE CONTRACTOR/ENGINEER OF ANY DISCREPANCIES
- 9. PRIOR TO ANY WORK OVER EXISTING TOWN—OWNED UTILITIES, CONTRACTOR TO EVALUATE CONDITION OF SUBSURFACE UTILITIES PRIOR TO CONSTRUCTION. A POST—CONSTRUCTION EVALUATION SHALL ALSO BE PERFORMED TO IDENTIFY ANY DAMAGE CAUSED DURING CONSTRUCTION.
- 10. ANY INSTALLATION OF UTILITY POLES OR UNDERGROUND CONDUIT WITHIN THE PUBLIC RIGHT-OF-WAY WILL REQUIRE A GRANT OF LOCATION FROM THE BOARD OF SELECTMEN.

PLANTING NOTES

- 1. MAINTENANCE SHALL BEGIN IMMEDIATELY AFTER PLANTING AND WILL CONTINUE UNTIL FINAL WRITTEN ACCEPTANCE OF PLANT MATERIAL.
- 2. MAINTAIN POSITIVE DRAINAGE AWAY FROM ALL BUILDING FOUNDATIONS AND STRUCTURES.
- 3. MAXIMUM SLOPE WITHIN DISTURBED AREAS SHALL NOT EXCEED 3:1, UNLESS OTHERWISE NOTED.
- 4. THE LANDSCAPE CONTRACTOR SHALL SUPPLY ALL PLANT MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE PLANTINGS SHOWN ON THE DRAWINGS.
- 5. MATERIALS SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE AMERICAN NURSERY AND LANDSCAPE ASSOCIATION.
- 6. PLANTS SHALL BEAR THE SAME RELATIONSHIP TO FINISH GRADE AS TO ORIGINAL GRADES BEFORE DIGGING.
- 7. PLANTS TO BE BALLED IN BURLAP OR CONTAINERIZED.
- 8. AREAS PLANTED WITH EVERGREEN TREES SHALL BE COVERED WITH A MINIMUM 3" OF MULCH. MULCH FOR PLANTED AREAS TO BE AGED PINE BARK: PARTIALLY DECOMPOSED, DARK BROWN IN COLOR AND FREE OF WOOD CHIPS THICKER THAN 1/4 INCH.
- 9. THE LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL PLANT MATERIALS FOR ONE (1) FULL YEAR FROM DATE OF ACCEPTANCE.
- 10. PLANT MATERIALS ARE SUBJECT TO THE APPROVAL OF THE LANDSCAPE ARCHITECT, AT THE NURSERY, AND AT THE SITE.
- 11. PLANT SPECIES AS INDICATED IN THE PLANT LIST ARE SUGGESTIONS ONLY. FINAL SELECTION OF SPECIES SHALL OCCUR AT THE TIME OF PLANT PURCHASE, DEPENDING ON AVAILABILITY. PLANT SIZE AND QUANTITY SHALL NOT CHANGE WITHOUT APPROVAL OF CONTRACTOR/LANDSCAPE ARCHITECT.

ABBREVIATIONS

BOTTOM OF CURB

BIT CONC BITUMINIOUS CONCRETE BORDERING VEGETATED WETLANDS CATCH BASIN CB/DH CONC. BOUND/DRILL HOLE CHAIN LINK FENCE DUCTILE IRON PIPE DRAIN MANHOLE EROSION CONTROL BARRIER FLARED END SECTION FIRE HYDRANT FOC FACE OF CURB FD FOUND GAS GATE HEADWALL ILSF ISOLATED LAND SUBJECT TO FLOODING IRON PIPE ISW ISOLATED WETLANDS LANDSCAPED AREA LOW LIMIT OF WORK N/F NOW OR FORMERLY NOT TO SCALE OCS OUTLET CONTROL STRUCTURE PRECAST CONCRETE CURB RETAINING WALL REINFORCED CONCRETE PIPE STREET LIGHT CIRCUIT SMH SEWER MANHOLE TOP OF CURB TELEPHONE CABLE VGC VERTICAL GRANITE CURB WATER GATE

LEGEND

■ STONE BOUND W/DRILL HOLE

CONCRETE BOUND

SEWER MANHOLE

DRAIN MANHOLE

WATER MANHOLE

CABLE MANHOLE

MANHOLE

HYDRANT

₩ W WATER GATE

© G GAS GATE

CATCH BASIN

UTILITY POLE

UTILITY POLE W/LIGHT

 $m{f v}$ UTILITY POLE W/TRANSFORMER

ELECTRIC MANHOLE

TELEPHONE MANHOLE

STONE BOUND W/ESCUTCHEON PIN

WATER VALVE

CATCH BASIN

FIRE HYDRANT

TREE FILTER

SEWER MANHOLE

· · — WETLAND LINE/FLAG

---- × ---- FENCE LINE

—— — — PROPERTY LINE

ISSUED FOR PERMITTING

NOT FOR CONSTRUCTION

OF PARKING SPACES

THORNDIKE PLACE

PROFESSIONAL ENGINEER

MESSION

CIVIL

No. 42747

DATE

DOROTHY ROAD

ARLINGTON

MASSACHUSETTS (MIDDLESEX COUNTY)

GENERAL NOTES AND LEGEND

MARCH 13, 2020

REV	REVISIONS:				
NO.	DATE	DESC.			
1	11/03/20	REVISED BUILDING			
		•			

PREPARED FOR:

ARLINGTON LAND REALTY, LLC 84 SHERMAN STREET, 2ND FLOOR CAMBRIDGE, MA 02140



617 896 4300

Boston, Massachusetts 02127

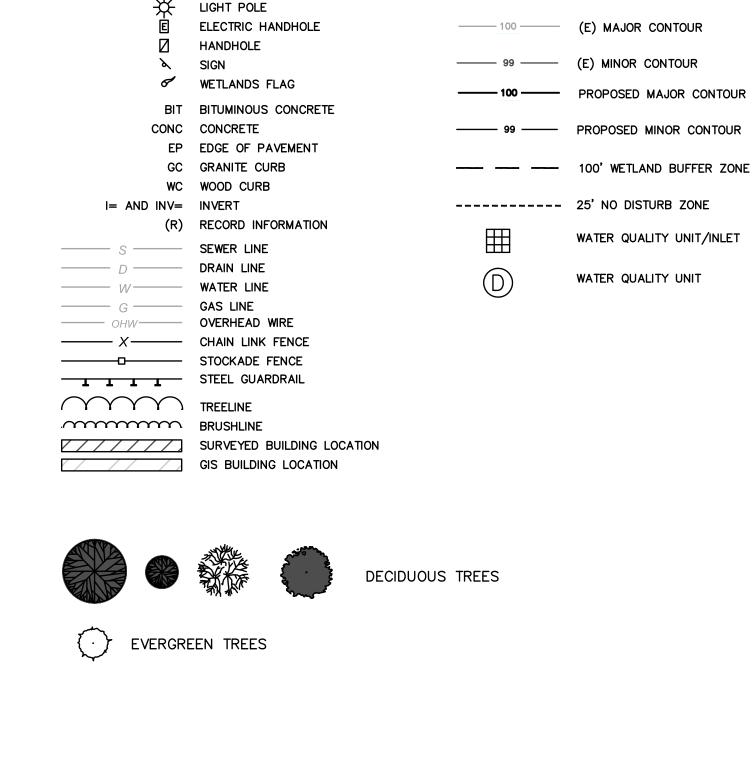
© 2020 BSC Group, Inc.
SCALE: NONE

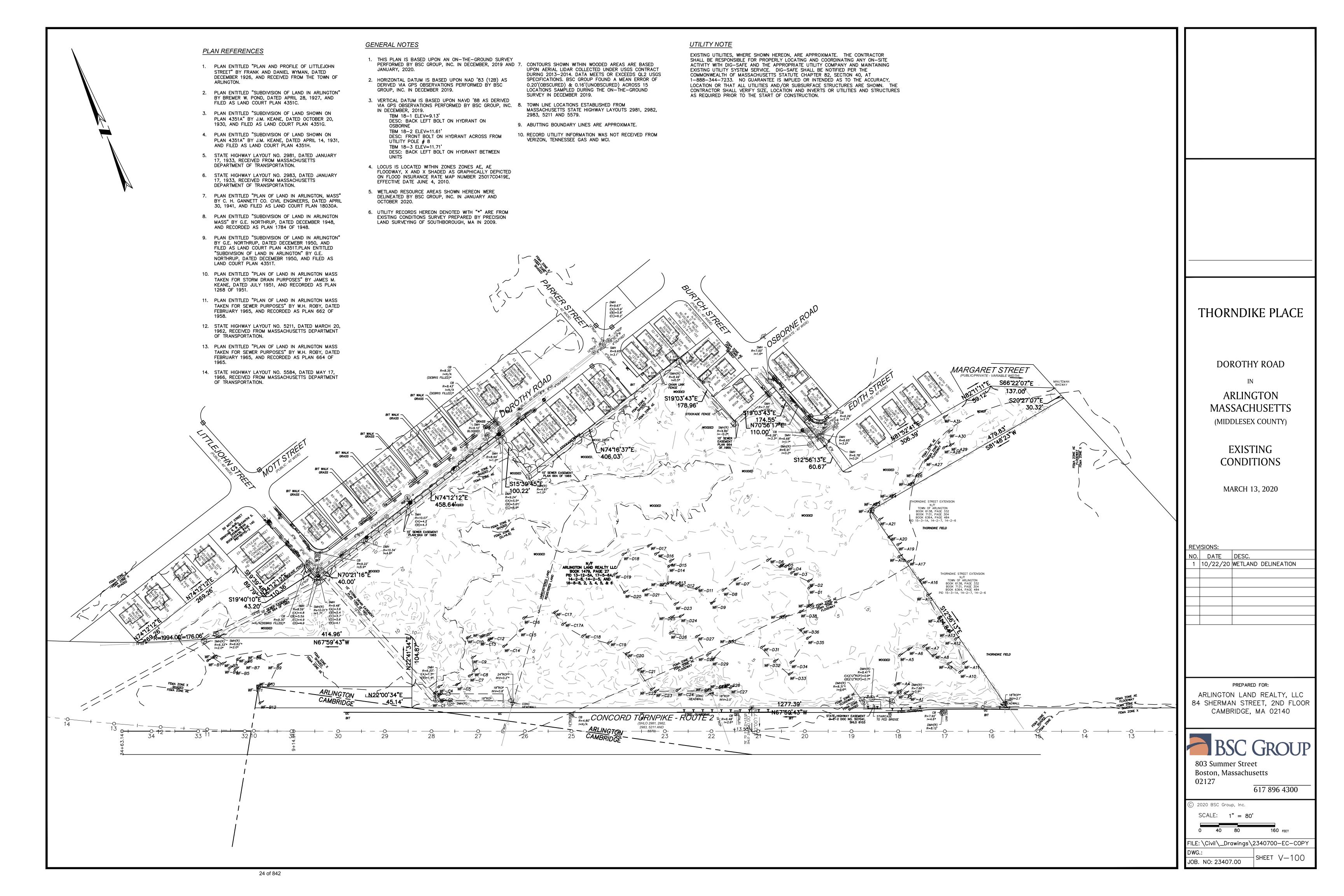
FILE: 2340700\C\D\2340700-LN

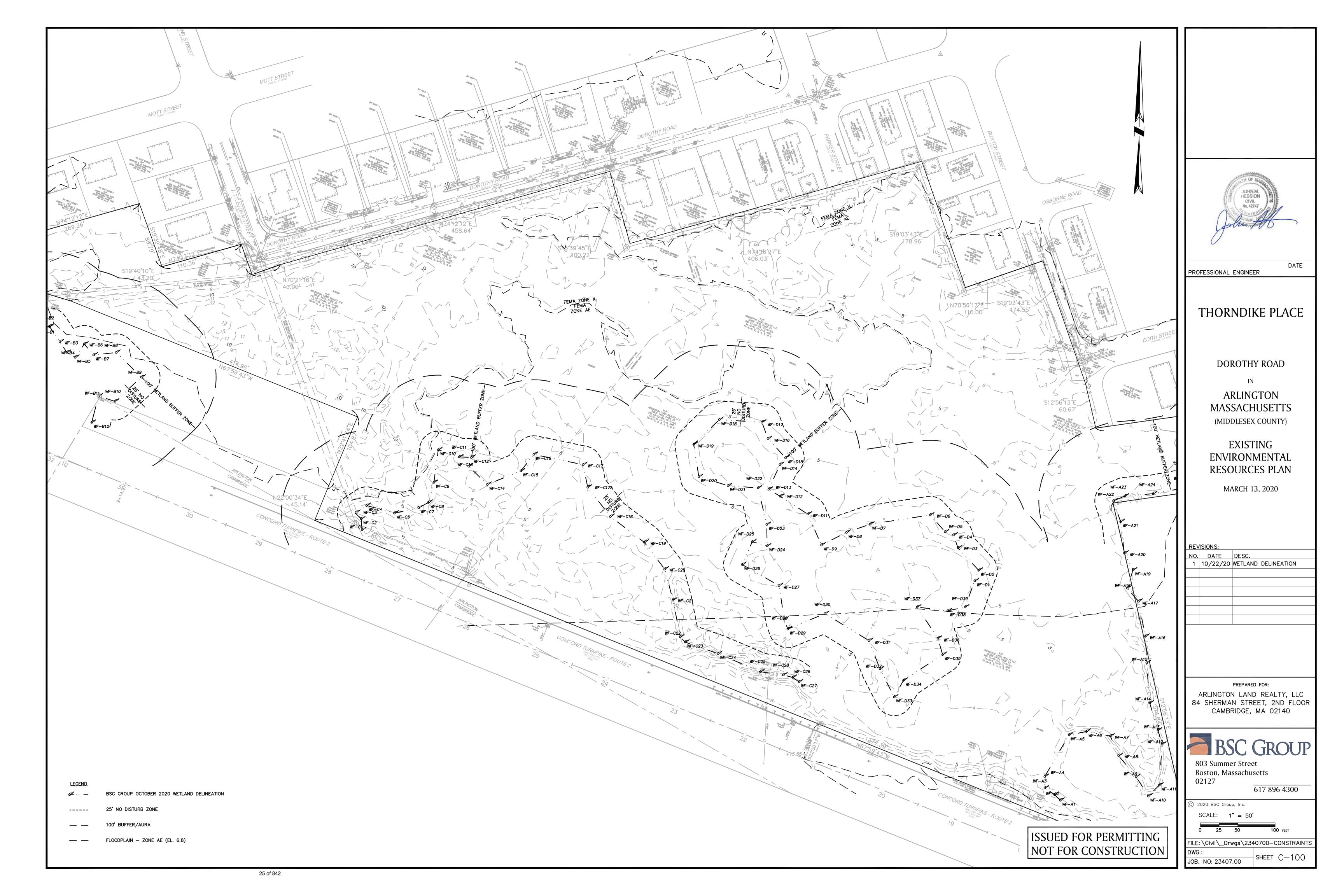
DWG.:

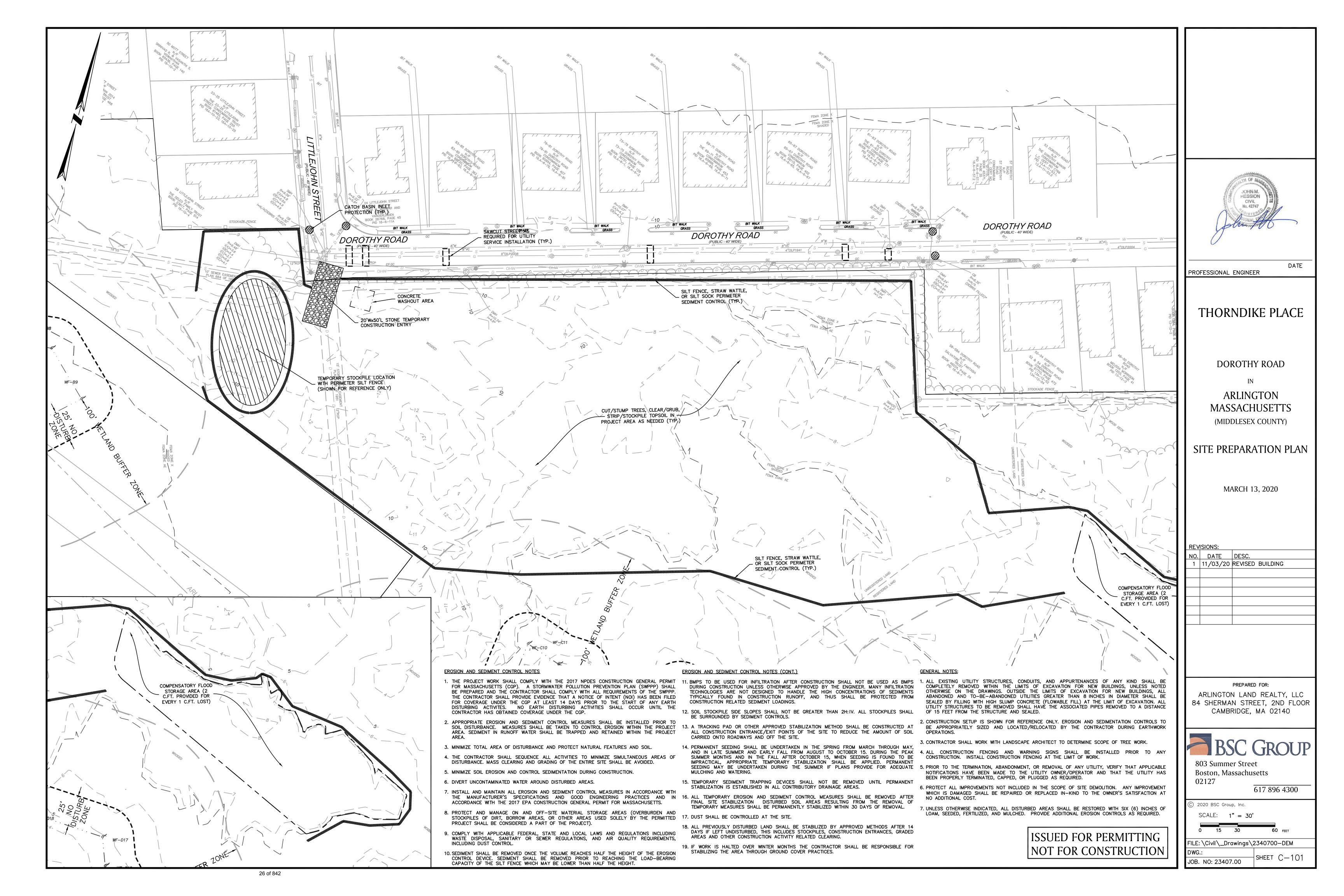
JOB. NO: 23407.00

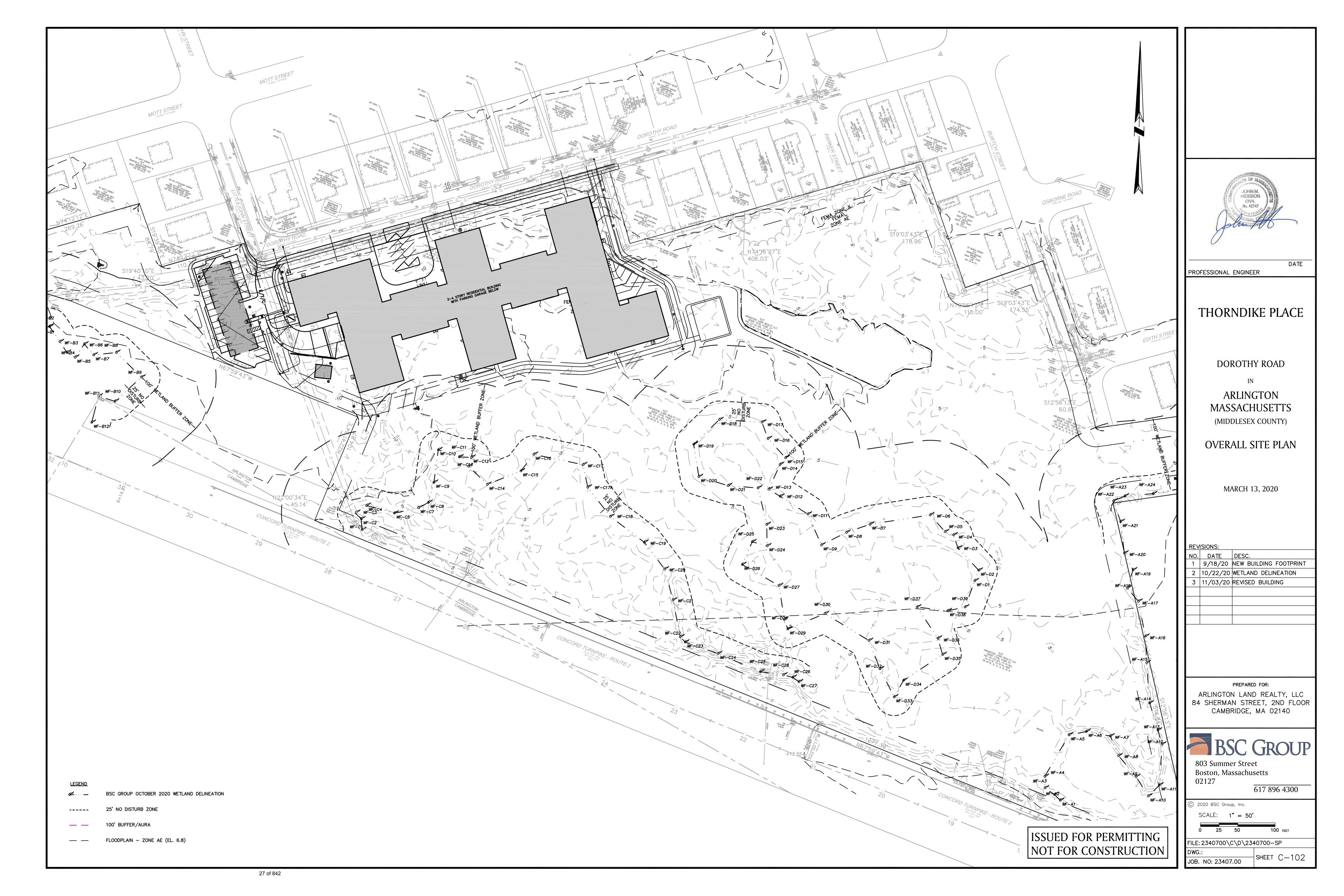
SHEET G-101

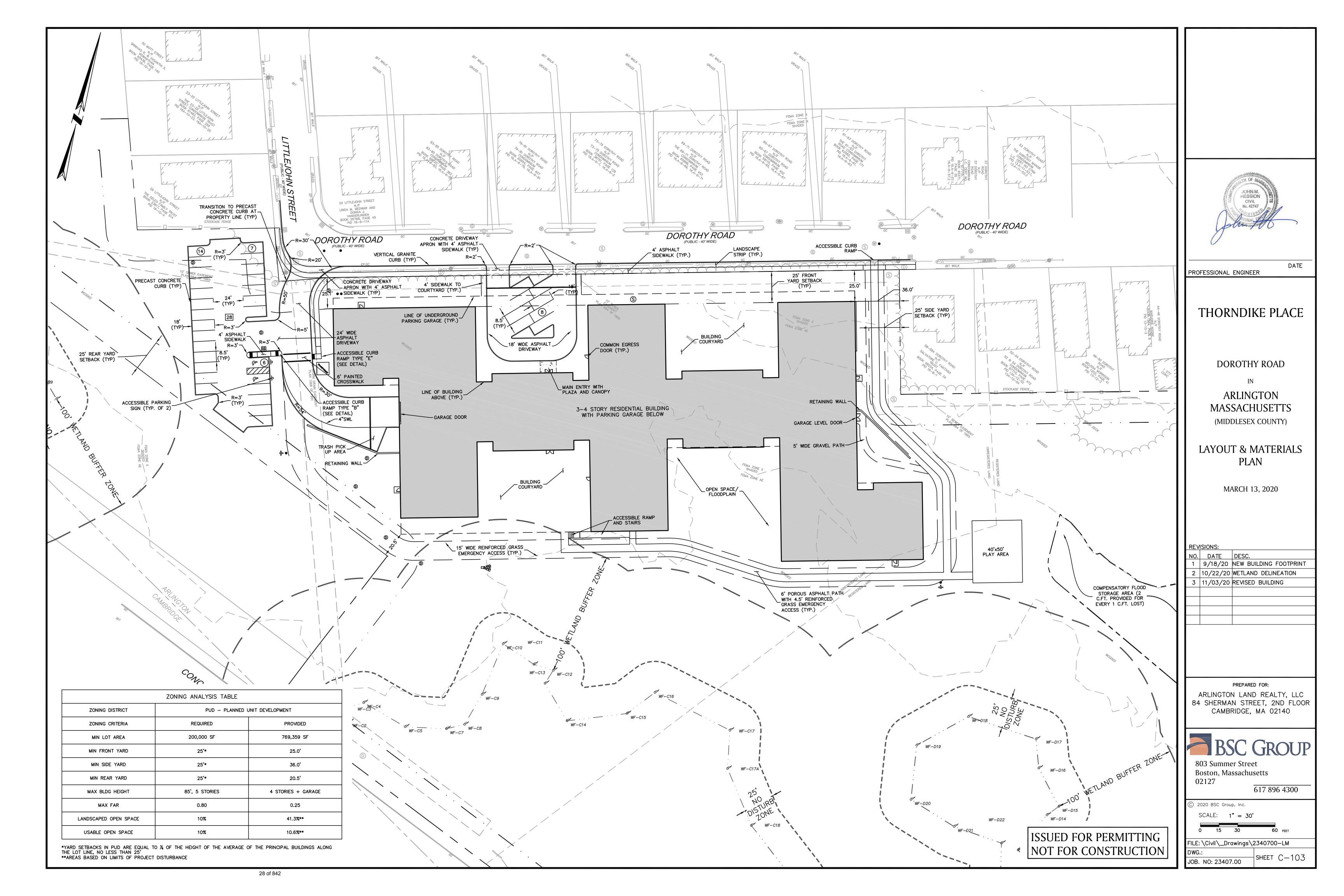


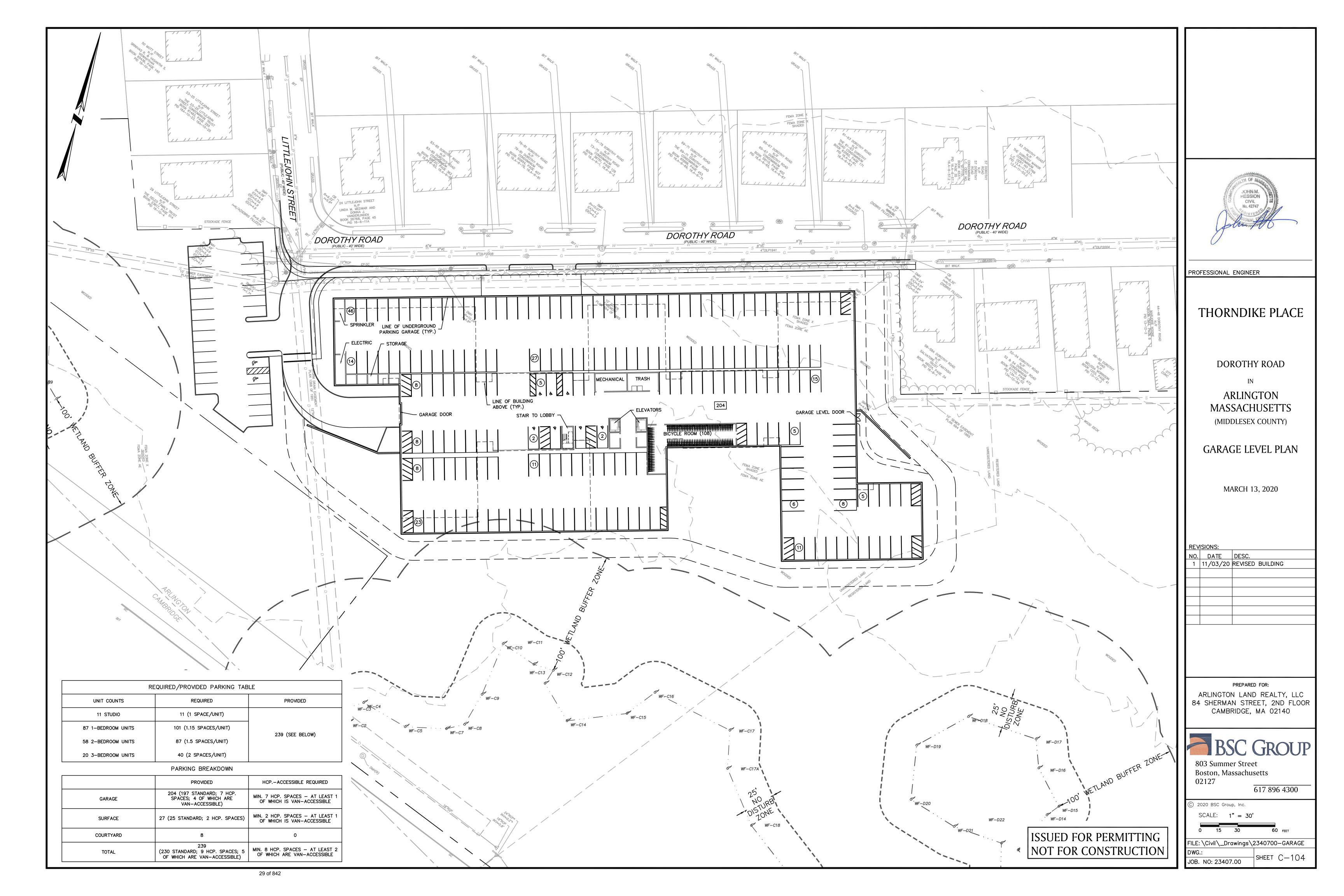


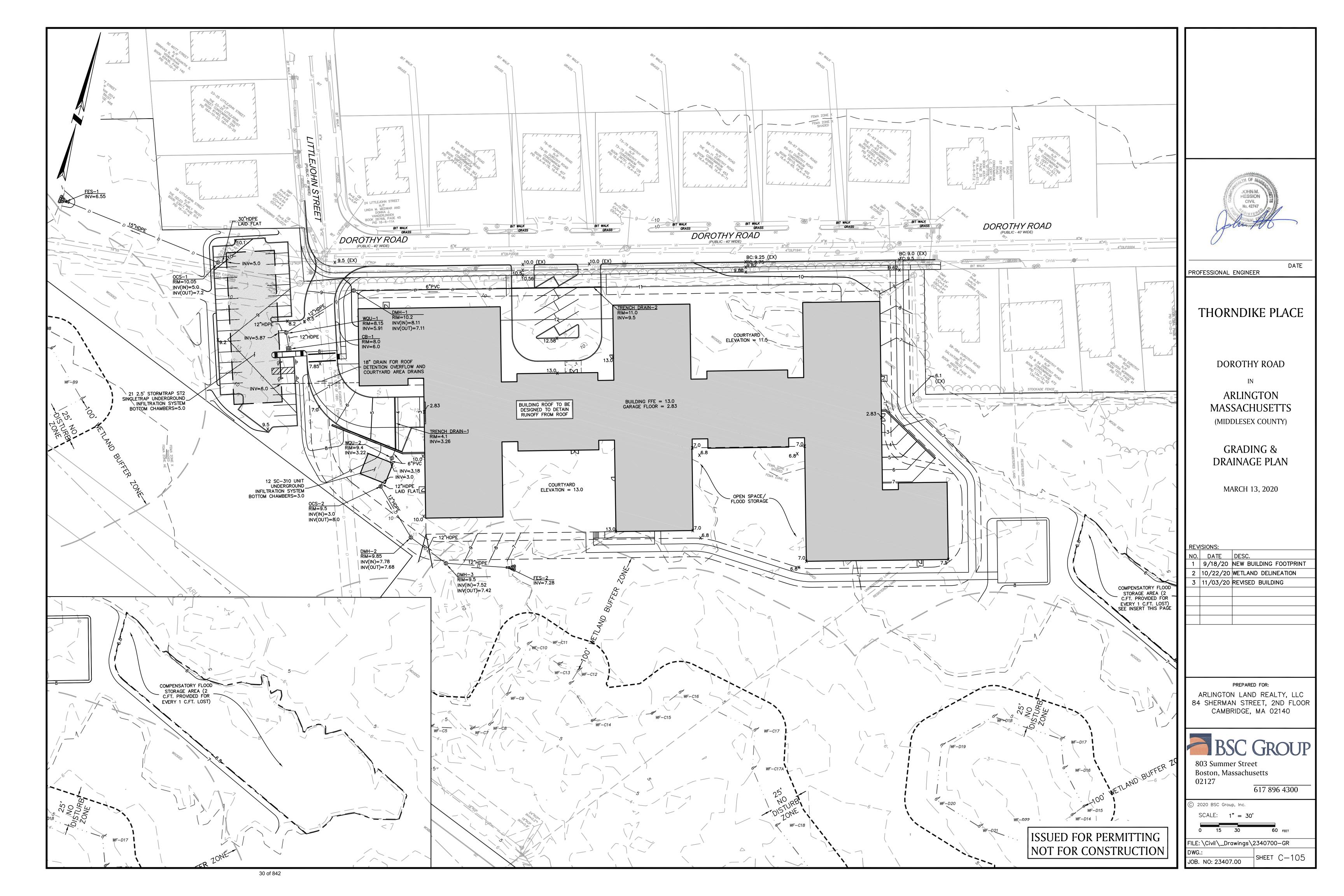


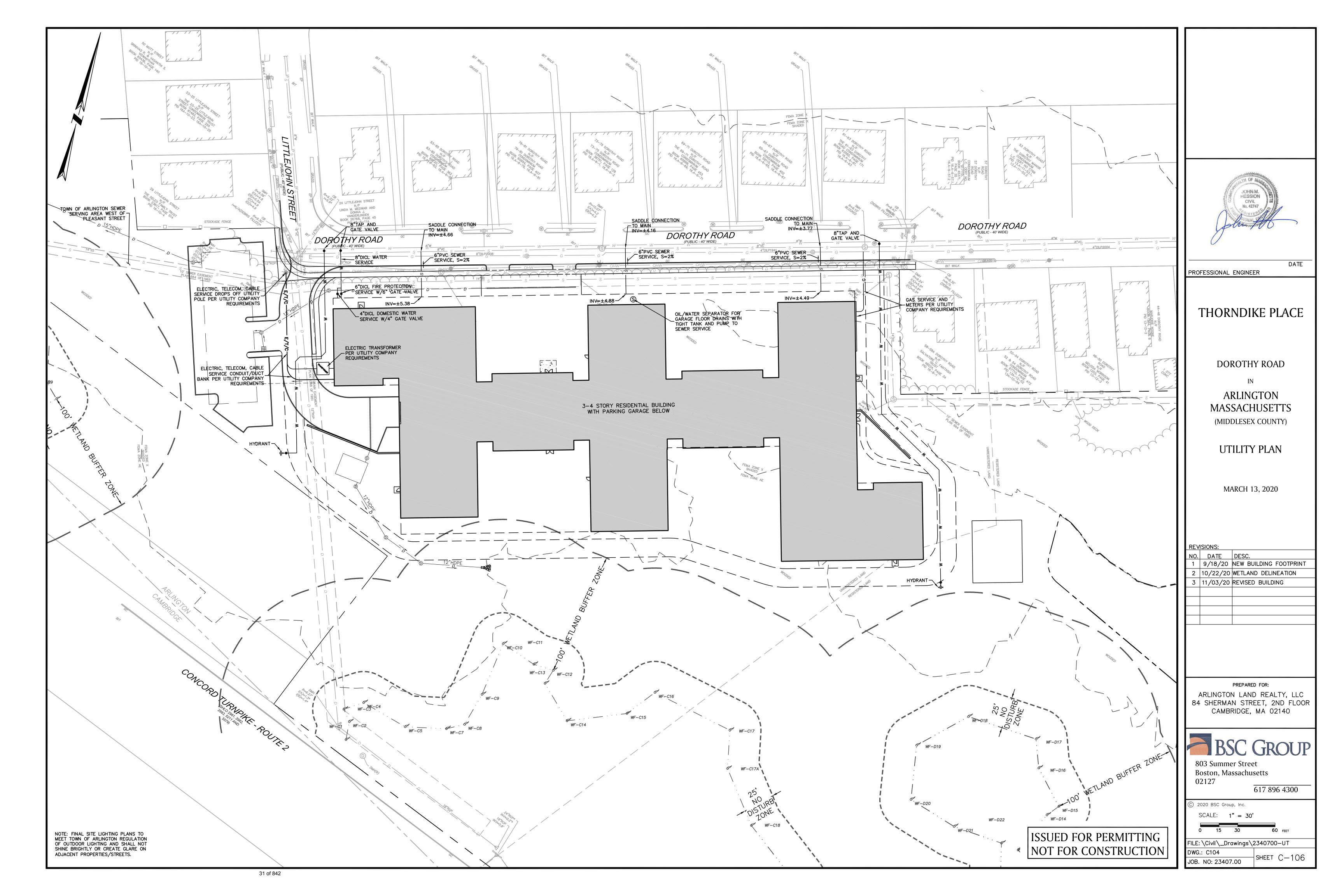


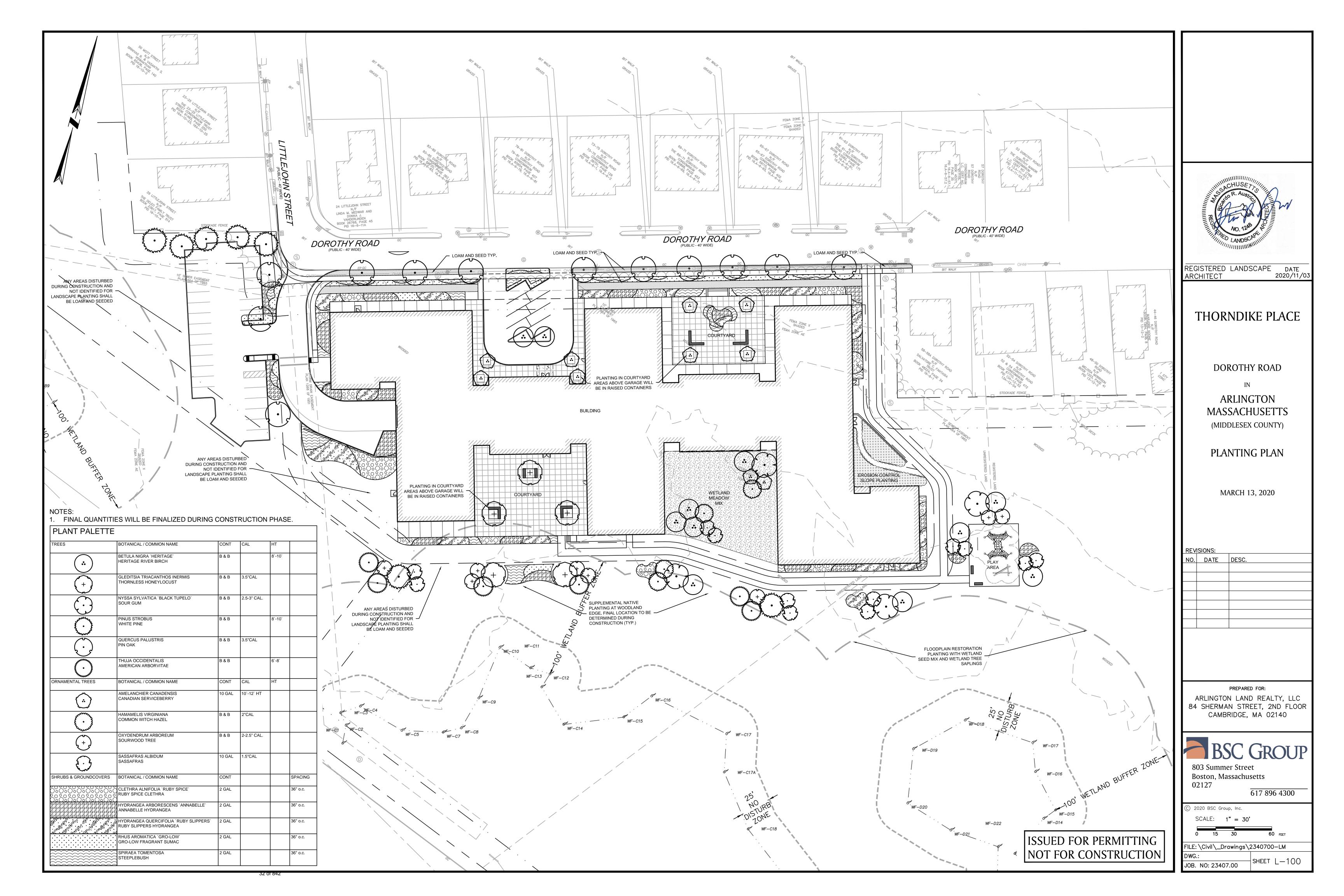


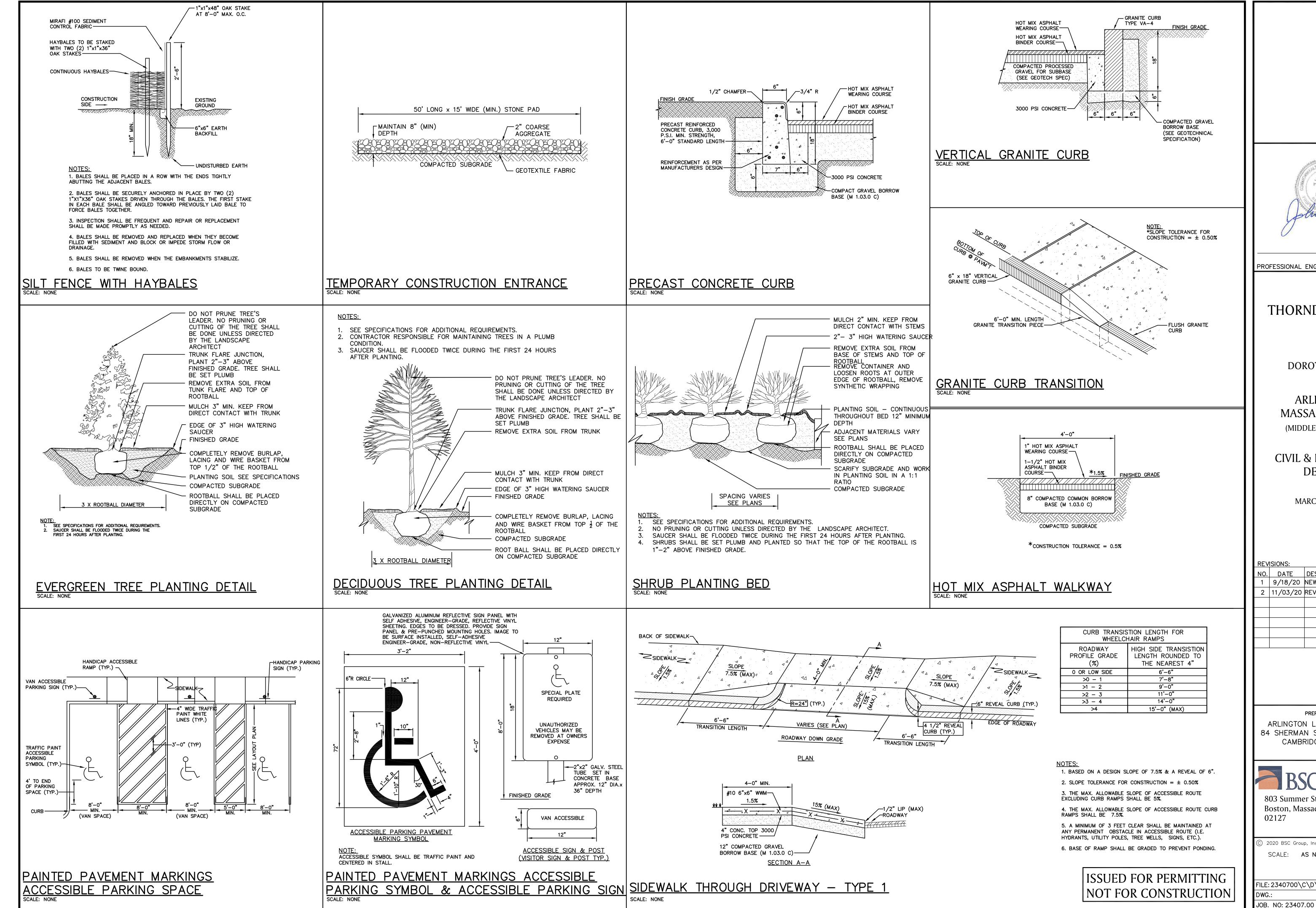












MESSION CIVIL No. 42747

PROFESSIONAL ENGINEER

DATE

THORNDIKE PLACE

DOROTHY ROAD

ARLINGTON **MASSACHUSETTS**

(MIDDLESEX COUNTY)

CIVIL & LANDSCAPE **DETAILS**

MARCH 13, 2020

REVISIONS: NO. DATE DESC. 1 | 9/18/20 | NEW BUILDING FOOTPRINT 2 11/03/20 REVISED BUILDING

PREPARED FOR:

ARLINGTON LAND REALTY, LLC 84 SHERMAN STREET, 2ND FLOOR CAMBRIDGE, MA 02140



803 Summer Street Boston, Massachusetts 02127

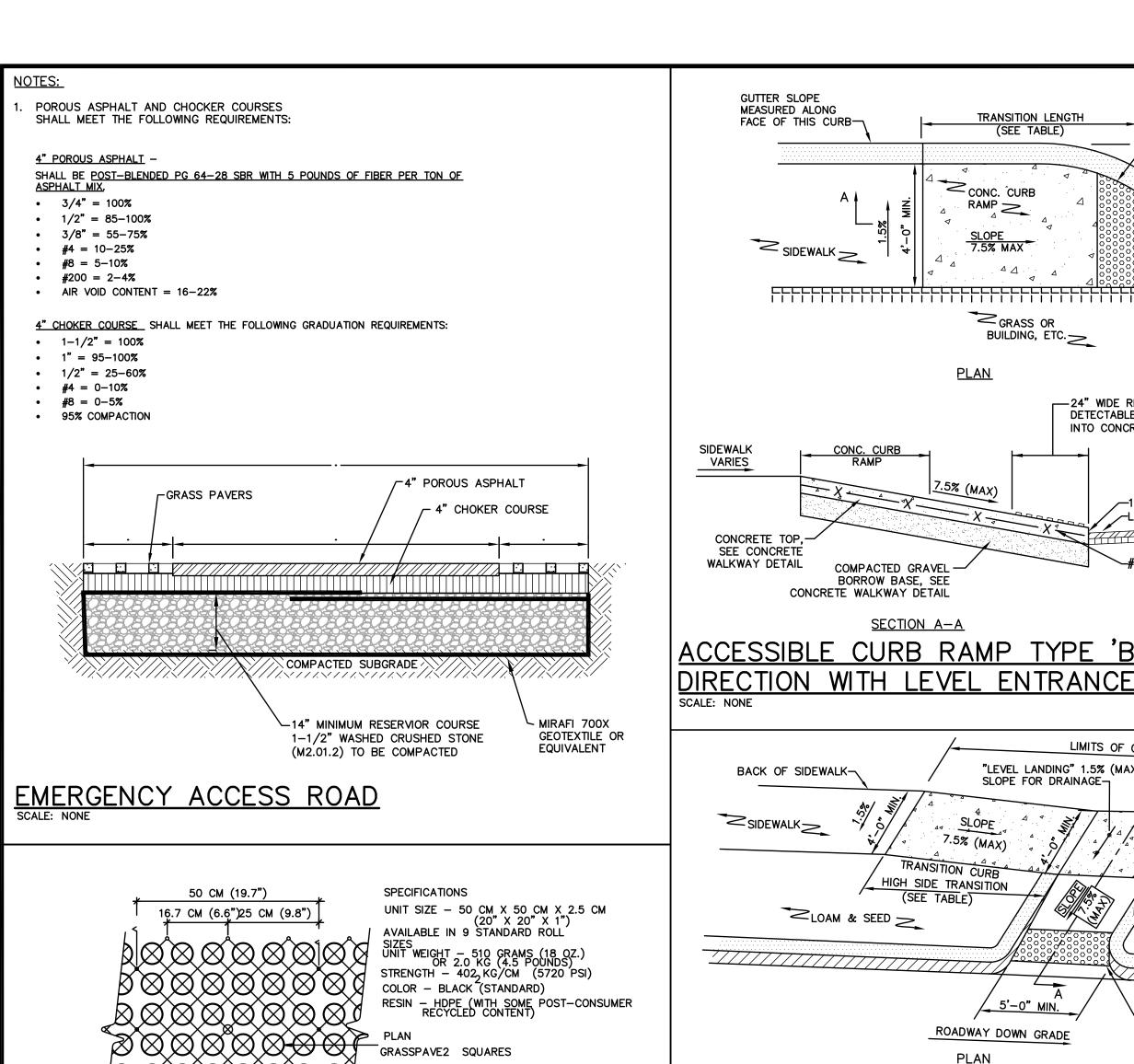
617 896 4300

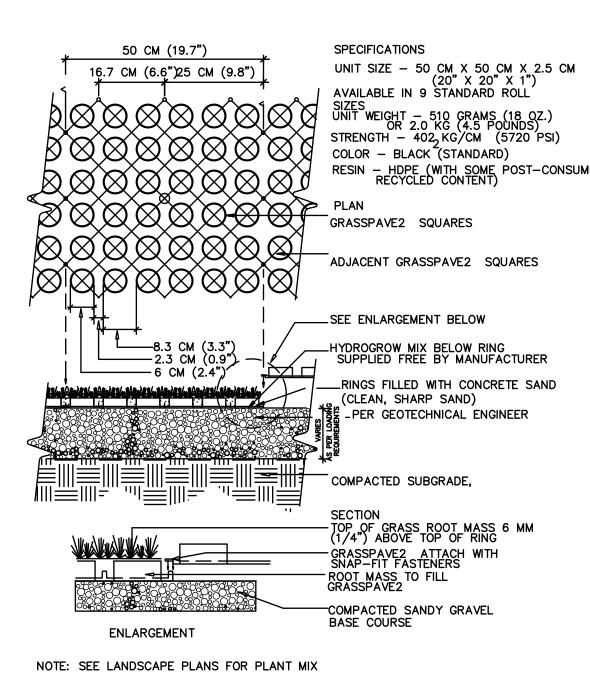
SHEET C-200

© 2020 BSC Group, Inc. SCALE: AS NOTED

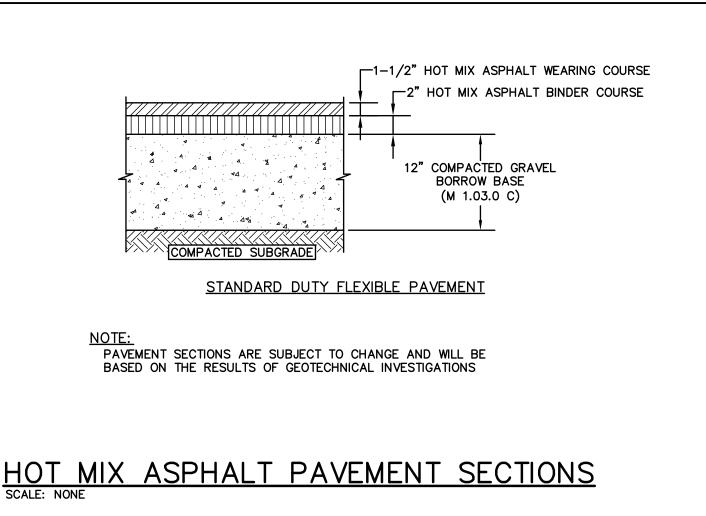
FILE: 2340700\C\D\2340700-DET

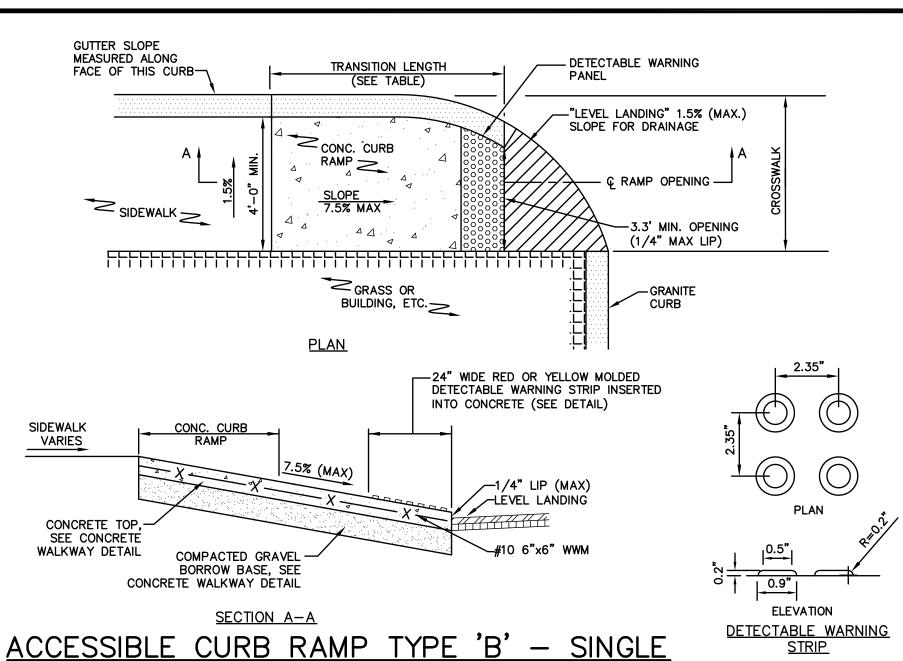
33 of 842





GRASSPAVE PRODUCT (OR APPROVED EQUAL)





LIMITS OF CONCRETE RAMP

7.5% (MAX)

EDGE OF ROADWAY

6'-6" MIN.

_DETECTABLE

— 24" WIDE RED OR YELLOW MOLDED

---CURB LINE

~ROADWAY

INTO CONCRETE (SEE DETAIL)

DETECTABLE WARNING STRIP INSERTED

—1/4" LIP (MAX)

FINISH GRADE IN FRONT

-EXPANSION JOINT

ËACH WAY (TYP.)

-3000 PSI CONCRETE

- COREDRILL 6"

JOINT (TYP.)

4 REBAR, 12" O.C.

DEEP MIN., GROUT

LOW SIDE TRANSITION

─6" REVEAL CURB

"LEVEL LANDING" 1.5% (MAX.)

SLOPE FOR DRAINAGE-

7.5% (MAX)

ROADWAY DOWN GRADE

1.5% (MAX)

ACCESSIBLE CURB RAMP TYPE 'E' - PARALLEL

-SEE HANDRAIL DETAIL

TRANSITION CURB

HIGH SIDE TRANSITION

BACK OF SIDEWALK-

₹LOAM & SEED ≥

4-0" MIN.

1.5%

COMPACTED GRAVEL

CONCRETE WALKWAY DETAIL

6" (MIN.)

BORROW BASE

 $(M 1.03.0 C)^{-1}$

-1-1/2" O.D. BLACK STEEL PIPE RAIL. WELDED

-1/2" DIA. RAIL SUPPORT

TO RAIL SUPPORT

WELDED TO POST.

HANDRAIL DETAIL

CONCRETE STAIRS
SCALE: NONE

GRAVEL

BORROW BASE, SEE

SECTION A-A

PERPENDICULAR WITH LANDSCAPING STRIP

#10 6"x6" WWM-

SIDEWALK

CONCRETE TOP,

SEE CONCRETE WALKWAY DETAIL

EXPANSION JOINT——

SUBGRADE-

CURB TRANSITION LENGTH FOR WHEELCHAIR RAMPS			
ROADWAY PROFILE GRADE (%)	TRANSITION LENGTH ROUNDED TO THE NEAREST 4"		
O OR LOW SIDE	6'-6"		
>0 - 1	7'–8"		
>1 - 2	9'-0"		
>2 - 3	11'-0"		
>3 - 4	14'-0"		
>4	15'-0" (MAX)		

1. SLOPE TOLERANCE FOR RAMP AND SIDEWALK CONSTRUCTION = \pm 0.50%

RAMPS SHALL BE 7.5%.

ROADWAY

PROFILE GRADE

(%)

O OR LOW SIDE

>0 - 1

>1 - 2

>2 - 3

>3 - 4

CONSTRUCTION = \pm 0.50%

RAMPS SHALL BE 7.5%.

1. SLOPE TOLERANCE FOR RAMP AND SIDEWALK

2. THE MAX. ALLOWABLE SLOPE OF ACCESSIBLE ROUTE

3. THE MAX. ALLOWABLE SLOPE OF ACCESSIBLE ROUTE CURB

4. A MINIMUM OF 3 FEET CLEAR SHALL BE MAINTAINED AT

5. BASE OF RAMP SHALL BE GRADED TO PREVENT PONDING.

ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (I.E.

HYDRANTS, UTILITY POLES, TREE WELLS, SIGNS, ETC.).

SIDEWALK

→LOAM & SEED **→**

<u>;</u>

0.9"

ELEVATION

UNDISTURBED EARTH (TYP)

DETECTABLE WARNING STRIP

- 2. THE MAX. ALLOWABLE SLOPE OF ACCESSIBLE ROUTE EXCLUDING CURB RAMPS SHALL BE 5%. 3. THE MAX. ALLOWABLE SLOPE OF ACCESSIBLE ROUTE CURB
- 4. A MINIMUM OF 3 FEET CLEAR SHALL BE MAINTAINED AT ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (I.E. HYDRANTS, UTILITY POLES, TREE WELLS, SIGNS, ETC.).
- 5. BASE OF RAMP SHALL BE GRADED TO PREVENT PONDING.

CURB TRANSITION LENGTH FOR

WHEELCHAIR RAMPS

HIGH SIDE TRANSITION

LENGTH ROUNDED TO

THE NEAREST 4"

6'-6"

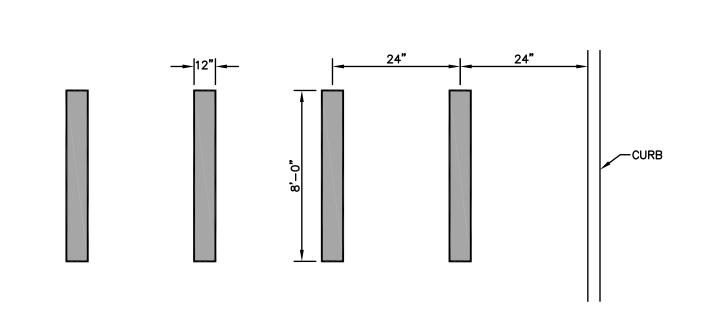
7'-8"

9'-0"

11'-0"

14'-0"

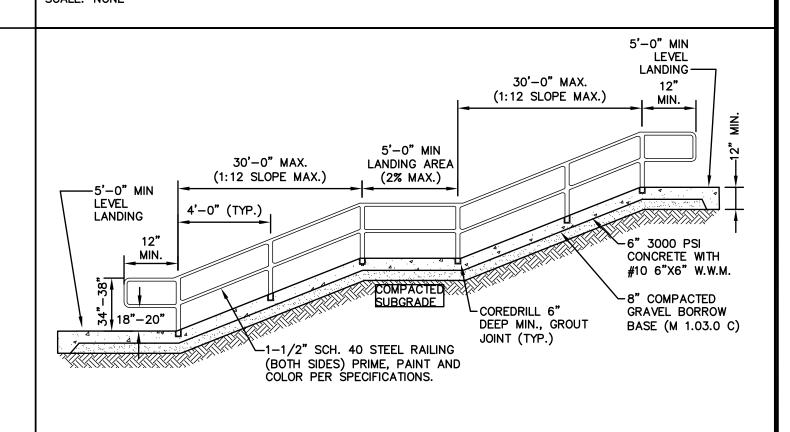
15'-0" (MAX)

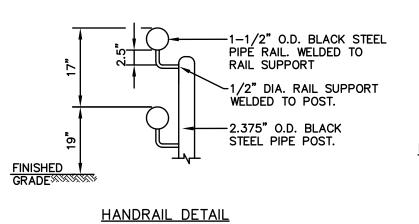


- 1. ALL TWELVE INCH (12") LINES SHALL BE APPLIED IN ONE APPLICATION, NO COMBINATION OF LINES (TWO - 6 INCH LINES) WILL BE ACCEPTED.
- 2. ALL PAVEMENT MARKING MATERIALS WHETHER THERMOPLASTIC OR WATERBORNE PAINT TO BE REFLECTORIZED WITH GLASS
- 3. LONGITUDINAL CROSSWALK LINES TO BE PARALLEL TO CURBLINE.
- 4. ALL LONGITUDINAL CROSSWALK LINES TO BE THE SAME
- LENGTH AND PROPERLY DRESSED.

5. STRIPES TO BE SOLID WHITE.

PEDESTRIAN CROSSWALK MARKINGS





1. EXPOSED SURFACES TO BE BRUSHED FINISH TROWELED EDGES. 2. MINIMUM WIDTH TO BE 48" CLEAR HANDRAIL TO HANDRAIL

MULTI-TIER RAMP SCALE: NONE

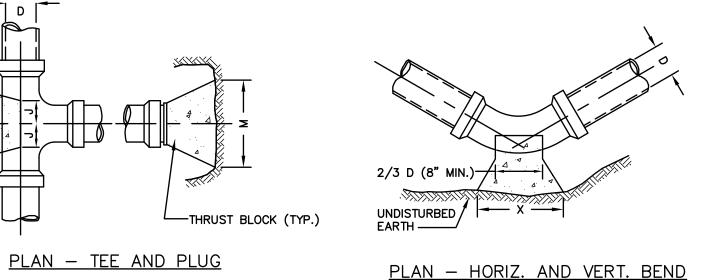
SIZE OF BRANCH	J	K	L	М	N	0
4" THRU 8"	10"	10"	1'-0"	2'-0"	1'-6"	10"
10" THRU 16"	1'-0"	1'-6"	1'-8"	3'-10"	2'-10"	1'-6"
24"	1'-4"	2'-0"	2'-6"	5'-0"	3'-6"	1'-8"

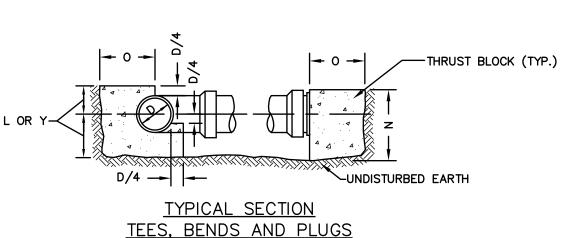
TEES	AND	PLUGS	

	90 & 45 BENDS			22 1/2 & 11 1/4		
D	4"TO8"	10"TO16"	24"	4"TO 8"	10"TO16"	24"
Х	1'-8"	3'-4"	3'-6"	1'-4"	2'-0"	3'-6"
Υ	1'-2"	1'-8"	2'-4"	1'-0"	1'-2"	2'-4"
BENDS						

- 1. PROVIDE 3000 PSI CONCRETE THRUST BLOCKS AT ALL BENDS, DEAD ENDS, & TEES UNLESS OTHERWISE DIRECTED. CONCRETE FOR ALL THRUST BLOCKS TO BE PLACED AGAINST FIRM, UNDISTURBED SOIL. PROVIDE APPROVED ANCHOR HARNESS RODS & SOCKET CLAMPS AS SPECIFIED & IN ACCORDANCE WITH PIPE MANUFACTURERS RECOMMENDATIONS WHERE SOIL HAS BEEN DISTURBED OR THRUST BLOCKS CANNOT BE USED, AS DIRECTED BY THE ENGINEER.
- 2. ALL SOCKET CLAMP METAL SHALL BE COATED WITH BLACK ASPHALTUM OR OTHER WATER DEPARTMENT APPROVED COATINGS.
- 3. CONCRETE THRUST BLOCKS POURED BEHIND 3-WAY TEE & HYDRANT SHOE TO BE USED WITH SOCKET CLAMPS. 4. NO CONCRETE SHALL COVER PIPE JOINTS, FITTING JOINTS, BOLTS OR

ISSUED FOR PERMITTING NOT FOR CONSTRUCTION





CONCRETE THRUST BLOCK FOR PRESSURE PIPE

PREPARED FOR:

ARLINGTON LAND REALTY, LLC

84 SHERMAN STREET, 2ND FLOOR

CAMBRIDGE, MA 02140

MESSION CIVIL No. 42747

THORNDIKE PLACE

DOROTHY ROAD

ARLINGTON

MASSACHUSETTS

(MIDDLESEX COUNTY)

CIVIL & LANDSCAPE

DETAILS

MARCH 13, 2020

1 | 9/18/20 | NEW BUILDING FOOTPRINT

2 11/03/20 REVISED BUILDING

REVISIONS:

NO. DATE DESC.

PROFESSIONAL ENGINEER

DATE

803 Summer Street Boston, Massachusetts

617 896 4300

SCALE: AS NOTED

© 2020 BSC Group, Inc.

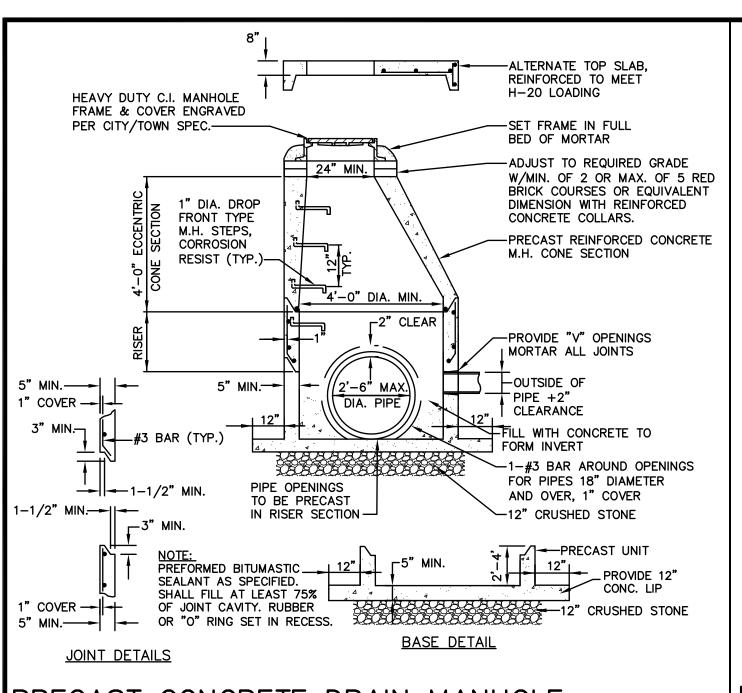
FILE: 2340700\C\D\2340700-DET SHEET C-201 JOB. NO: 23407.00

34 of 842

-2.375" O.D. BLACK STEEL PIPE POST. 1. EXPOSED SURFACES TO BE BRUSHED FINISH TROWELED EDGES.

SUBGRADE

2. MINIMUM WIDTH TO BE 48" CLEAR HANDRAIL TO HANDRAIL.



PRECAST CONCRETE DRAIN MANHOLE

Stormceptor

Frame and Cover

Suit Finished Grade

Varies Stormceptor Insert

72''Ø

A. A.

WATER QUALITY UNIT

HYDRANT MANUFACTURER

CONFORM TO LOCAL FIRE DEPT. STANDARDS

HYDRANT TO BE ADJUSTED

FINISH GRADE

UNDISTURBED EARTH-

CLASS "C" CONC. BACKING AGAINST UNDISTURBED MATERIAL-

TO GRADE AS REQUIRED -

Section Thru Chamber

(STORMCEPTOR OR APPROVED EQUAL)

STC 900 Precast Concrete Stormceptor® (900 U.S. Gallon Capacity)

Outlet

240 Outlet

Port

6'0 Orifice

Plan View

1. The Use Of Flexible Connection is Recommended at The Inlet

2. The Cover Should be Positioned Over The Outlet Drop Pipe and

3. The Stormceptor System is protected by one or more of the following U.S. Patents: #4985148, #5498331, #5725760, #5753115.

4. Contact a Concrete Pipe Division representative for further

Plate

Access opening/

(See note #2)

and Outlet Where Applicable.

#5849181, #6068765, #6371690.

details not listed on this drawing.

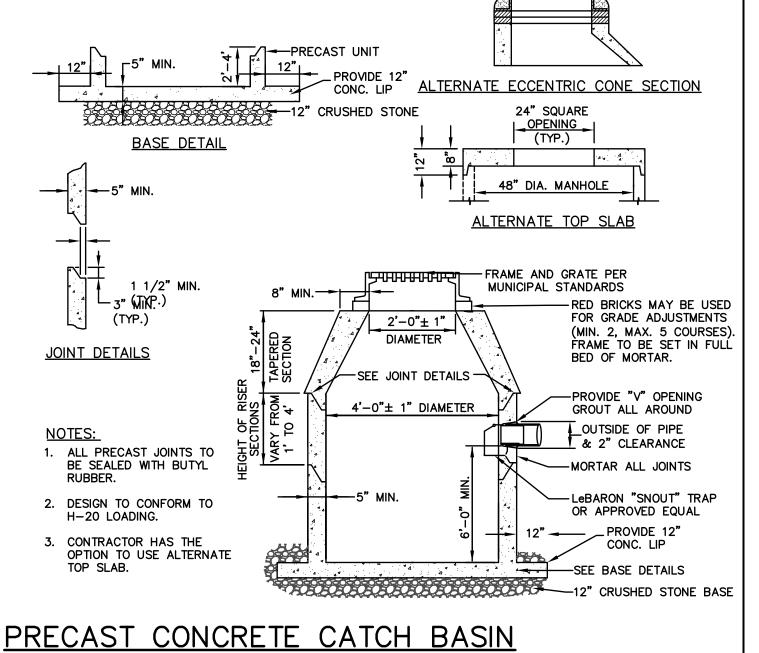
—ADJUSTABLE VALVE BOX PER LOCAL FIRE DEPT.

> ─ 6" GATE VALVE -M.J. FITTINGS

(SEE LOCAL FIRE DEPT. REQUIREMENTS)

(2 OR 3 WAY CONNECTION

AS REQUIRED)



PRECAST CONCRETE CATCH BASIN

- EXISTING PAVEMENT -FILTER BASKETS SHALL BE "SILT SACK", BY ACF ENVIRONMENTAL (800-644-9223);DANDY SACK", BY DANDY PRODUCTS (800-591-2284);OR APPROVED EQUIVALENT FILTER BASKETS TO BE PLACED IN ALL CATCH BASINS IN THE VICINITY OF NEW CONSTRUCTION. CATCH BASINS ARE TO BE PROTECTED AS SHOWN, WITH MINIMUM WEEKLY MAINTENANCE, OR AS REQUIRED AND REPLACED IF NECESSARY. (FOR USE WITH EXISTING CATCH BASINS)

GROUND SURFACE

BACKFILL MATERIAL:
COMPACT TO 95%
IN MAX 12" LIFTS

SECTION B-B

-PROVIDE

2"x2" OAK

UNDISTURBED MATERIAL

MARKER

CATCH BASIN INLET PROTECTION SCALE: NONE

PAVEMENT LIMITS FOR SERVICE CONNECTIONS

CRUSHED STONE TO 1

FT. ABOVE PIPE END 2

SECTION A-A

FT. BEYOND

-3/4" CRUSHED

STONE CRADLE

12" COVER FOR TRACER TAPE -

UNDISTURBED

PVC SEWER

_22-1/2° MIN. BEND

SERVICE CONNECTION

MIN SLOPE 2% AND

OTHERWISE DIRECTED

BY THE ENGINEER

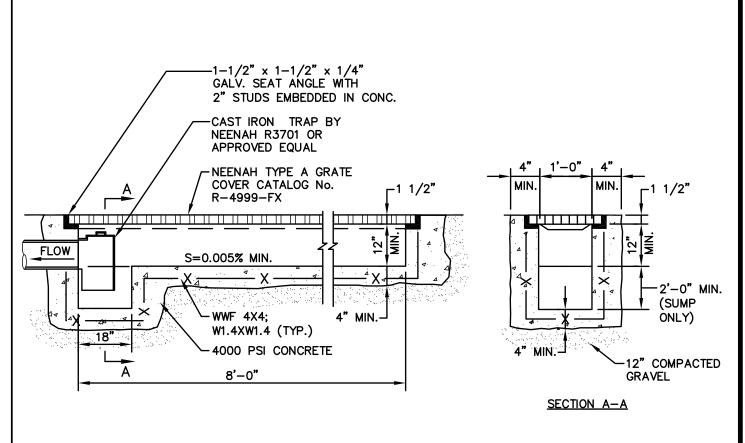
MAX SLOPE 5% UNLESS

(ROTATE AS

REQUIRED)

-Y-BRANCH

UTILITIES TO HAVE FLEXIBLE CONNECTION TO BUILDING. SEE MEP PLANS & COORDINATE WITH



CAST IN PLACE CONCRETE TRENCH DRAIN SCALE: NONE

FLARED END SECTION W/ STONE

PROTECTION (DISSIPATION BOWL)



THORNDIKE PLACE

DOROTHY ROAD

ARLINGTON

MASSACHUSETTS (MIDDLESEX COUNTY)

CIVIL & LANDSCAPE DETAILS

MARCH 13, 2020

REV	ISIONS:	
NO.	DATE	DESC.
1	9/18/20	NEW BUILDING FOOTPRINT
2	11/03/20	REVISED BUILDING

PREPARED FOR: ARLINGTON LAND REALTY, LLC 84 SHERMAN STREET, 2ND FLOOR

CAMBRIDGE, MA 02140

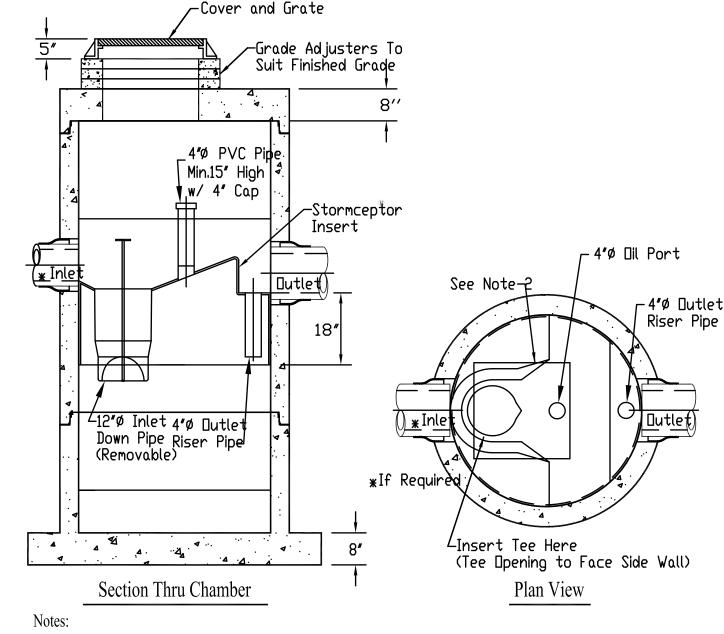
803 Summer Street Boston, Massachusetts

617 896 4300

© 2020 BSC Group, Inc. SCALE: AS NOTED

FILE: 2340700\C\D\2340700-DET SHEET C-202 JOB. NO: 23407.00

STC 450i Precast Concrete Stormceptor (450 U.S. Gallon Capacity)

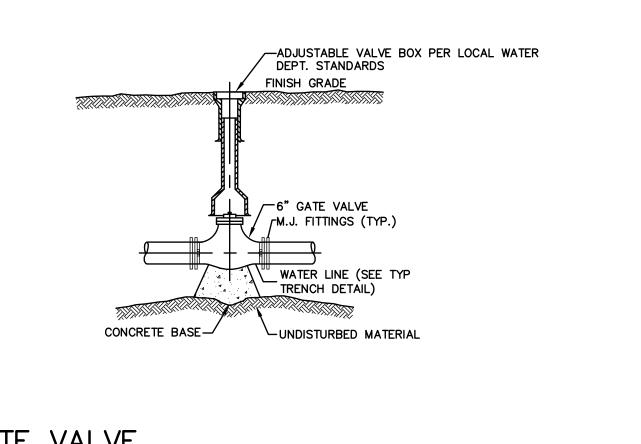


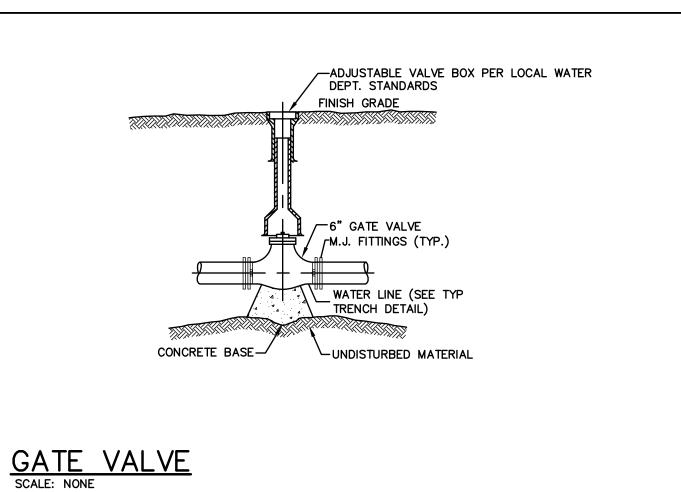
1. The Use Of Flexible Connection is Recommended at The Inlet and Outlet Where Applicable. 2. The Cover Should be Positioned Over The Inlet Drop Pipe and The Oil Port.

3. The Stormceptor System is protected by one or more of the following U.S. Patents: #4985148, #5498331, #5725760, #5753115, #5849181, #6068765, #6371690.

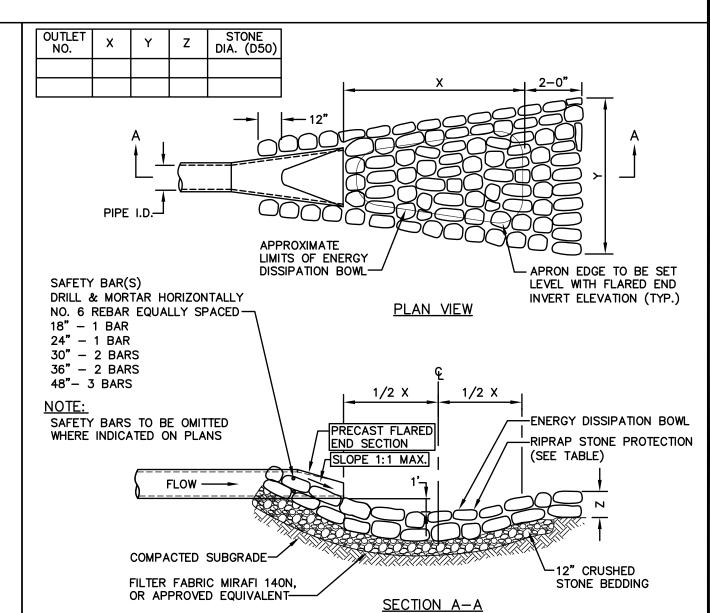
4. Contact a Concrete Pipe Division representative for further details not listed on this drawing.

WATER QUALITY CATCH BASIN (STORMCEPTOR 450i OR APPROVED EQUAL) SCALE: NONE





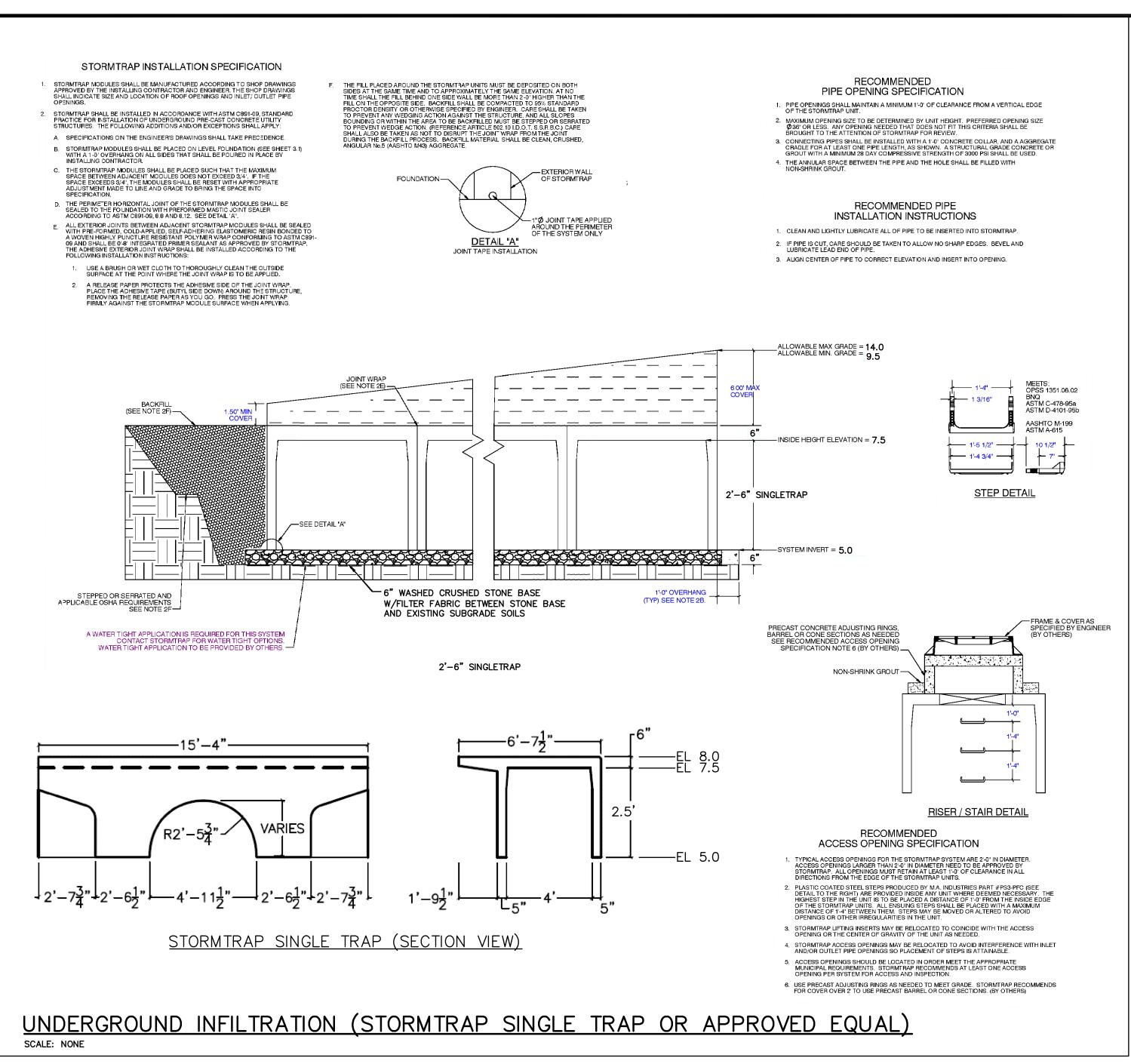
BUILDING SEWER SERVICE CONNECTION

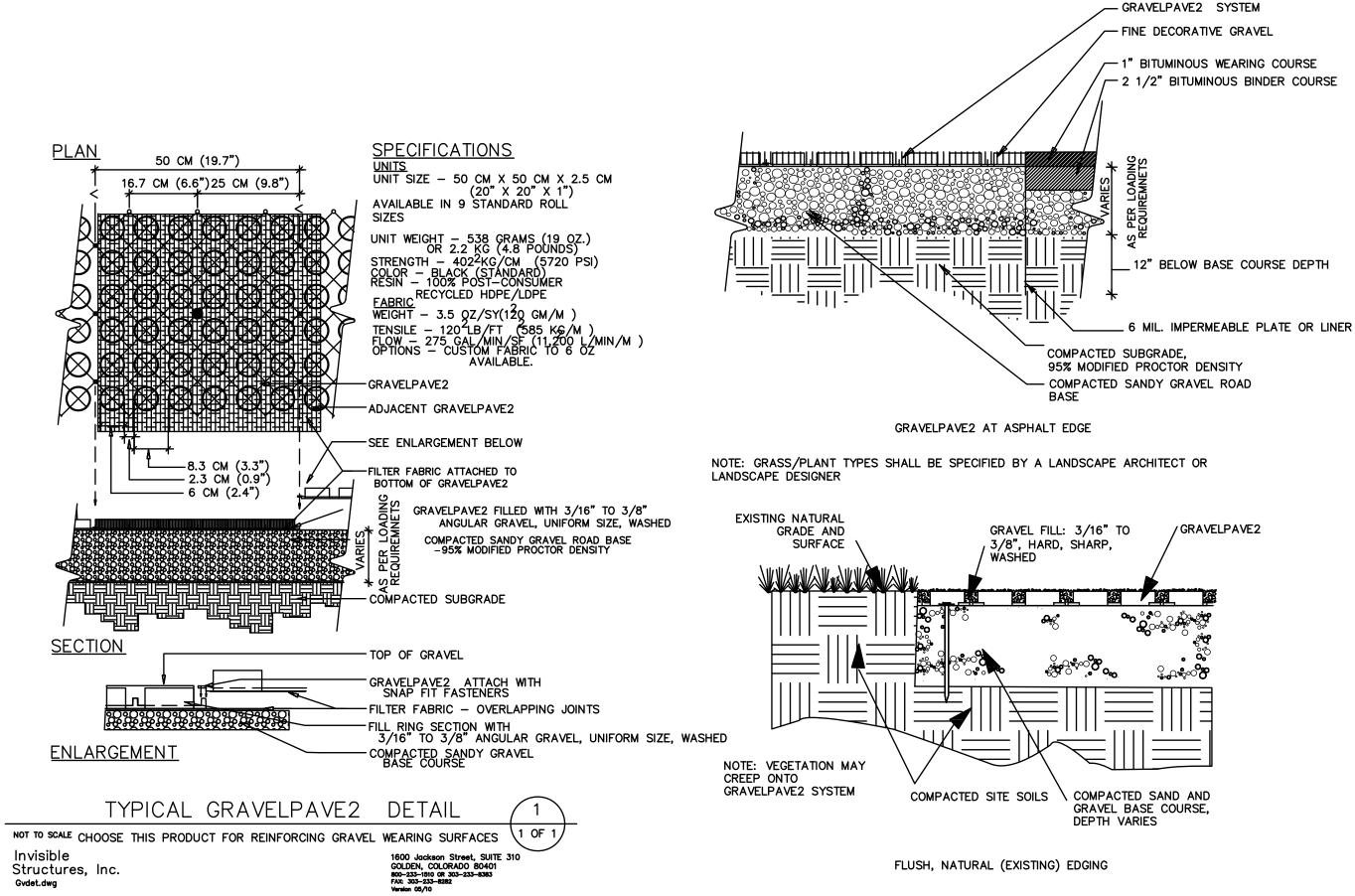


ISSUED FOR PERMITTING NOT FOR CONSTRUCTION

PROVIDE 7 CU. FT. 1/2" TO 1" CRUSHED STONE TO AT LEAST SEE TYPICAL TRENCH DETAIL— 6" ABOVE DRAIN HOLES--CLASS "C" CONC. BACKING AGAINST UNDISTURBED MATERIAL 6" DICL PIPE-FIRE HYDRANT & VALVE SCALE: NONE

35 of 842





Gvdet.dwg



DATE PROFESSIONAL ENGINEER

THORNDIKE PLACE

DOROTHY ROAD

ARLINGTON **MASSACHUSETTS**

(MIDDLESEX COUNTY)

CIVIL & LANDSCAPE DETAILS

MARCH 13, 2020

REVISIONS: NO. DATE DESC. 1 | 9/18/20 | NEW BUILDING FOOTPRINT 2 11/03/20 REVISED BUILDING

PREPARED FOR: ARLINGTON LAND REALTY, LLC

84 SHERMAN STREET, 2ND FLOOR CAMBRIDGE, MA 02140



803 Summer Street Boston, Massachusetts

617 896 4300

© 2020 BSC Group, Inc. SCALE: AS NOTED

JOB. NO: 23407.00

FILE: 2340700\C\D\2340700-DET

SHEET C-203

ISSUED FOR PERMITTING NOT FOR CONSTRUCTION

STORMWATER REPORT

THORNDIKE PLACE DOROTHY ROAD ARLINGTON, MA

NOVEMBER 2020

Owner/Applicant:

ARLINGTON LAND REALTY LLC 84 Sherman Street, 2nd Floor Cambridge, MA 02140

BSC Job Number: 23407.00

Prepared by:



803 Summer Street Boston, MA 02127

TABLE OF CONTENTS

-	_		_
1.	Λ	Drome	INFORMATION
	"	PROTECT	
	· ·	LINOSINCI	

- 1.01 PROJECT DESCRIPTION
- 1.02 PRE-DEVELOPMENT CONDITIONS
- 1.03 POST-DEVELOPMENT CONDITIONS

2.0 Drainage Summary

- 2.01 STORMWATER STANDARD 1 NEW STORMWATER CONVEYANCES
- 2.02 STORMWATER STANDARD 2 STORMWATER RUNOFF RATES
- 2.03 STORMWATER STANDARD 3 GROUNDWATER RECHARGE
- 2.04 STORMWATER STANDARD 4 TSS REMOVAL
- 2.05 STORMWATER STANDARD 5 LUHPPL
- 2.06 STORMWATER STANDARD 6 CRITICAL AREAS
- 2.07 STORMWATER STANDARD 7 REDEVELOPMENT PROJECTS
- 2.08 STORMWATER STANDARD 8 SEDIMENTATION & EROSION CONTROL PLAN
- 2.09 STORMWATER STANDARD 9 LONG TERM O&M PLAN
- 2.10 STORMWATER STANDARD 10 ILLICIT DISCHARGES
- 2.11 CONCLUSIONS
- 2.12 COMPENSATORY FLOOD STORAGE
- 3.0 CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL
- 4.0 Long-Term Pollution Prevention & Operation and Maintenance Plan
- 5.0 Hydrology Calculations
 - 5.01 EXISTING WATERSHED PLAN
 - 5.02 EXISTING HYDROLOGY CALCULATIONS (HYDROCADTM PRINTOUTS)
 - 5.03 PROPOSED WATERSHED PLAN
 - 5.04 PROPOSED HYDROLOGY CALCULATIONS (HYDROCADTM PRINTOUTS)
- 6.0 ADDITIONAL DRAINAGE CALCULATIONS
 - 6.01 TSS REMOVAL CALCULATIONS
 - 6.02 GROUNDWATER RECHARGE VOLUME CALCULATIONS
 - 6.03 WATER QUALITY VOLUME CALCULATIONS
 - 6.04 RIP-RAP OUTLET PROTECTION SIZING

APPENDICES

APPENDIX A – USGS LOCUS MAP

APPENDIX B – FEMA MAP

APPENDIX C – WEB SOIL SURVEY



SECTION 1.0

PROJECT INFORMATION



1.01 PROJECT DESCRIPTION

Arlington Realty, LLC (The Applicant) is seeking to construct a new multi-family housing development in Arlington, Massachusetts, hereinafter referred to as "the Project." The total property area is approximately 17.66 acres and is located off of Dorothy Road near the intersection with Littlejohn Street. The project is bounded on the north by Dorothy Road, on the east by residential properties and Thorndike Field, and bounded on the south and west by Concord Turnpike (Route 2).

The Project consists of clearing and grubbing of the northwest section of the property and construction of one 3-4 story multi-family apartment building with a lower level parking garage, as well as surface parking, walkways, courtyards, a playground, utility services, and a stormwater management system. The building has a footprint of approximately 51,555 square feet.

The Project is designed to comply with the Massachusetts General Laws (M.G.L.) Chapter 40B, which allows developers to override certain aspects of municipal zoning bylaws by providing a certain percentage of affordable housing, as well as the Department of Environmental Protection's Stormwater Management Standards. There are wetland resource areas in the south, west and east portions of the property. The Project is concentrated in the northwest area of the property and minimizes impacts to the 100-foot wetland buffer zones, which are regulated by the Arlington Wetlands Bylaw as Adjacent Upland Resource Areas (AURA's). Part of the site is located within the 1% Chance Annual Flood as defined by FEMA which is regulated under the Wetlands Protection Act and the Arlington Wetlands Bylaw as Bordering Land Subject to Flooding (BLSF). Compensatory flood storage is proved at a 2:1 ratio as described in section 2.12 below.

1.02 PRE-DEVELOPMENT CONDITIONS

The existing site topography generally slopes southeast across the property towards the wetlands located on the property with slopes ranging from 0-15%. The current site is comprised of forest and the primary soil classification identified by the NRCS Web Soil Survey is udorthents (655), which accounts for the majority of the property and all of the project area. As such, the soils have been modeled as Hydrologic Soil Group C.

The existing site being largely undeveloped has no existing drainage facilities and the majority of the stormwater runoff is directed to the wetlands on the property. A small portion of the site discharges to the north to Dorothy Road.

1.03 Post-Development Conditions

The proposed stormwater management system has been designed in a manner that will exceed the provisions of the Department of Environmental Protection (DEP) Stormwater Management Standards for a new construction project. The design is also in general conformance the with Town of Arlington Zoning Bylaws.

Stormwater runoff from the building will be detained on the roof of the building, with larger, less frequent storms overflowing through roof drains to an underground infiltration system in the adjacent surface parking lot. Stormwater runoff from the small parking/drop-off area at the main entrance to the building will be collected via a trench drain, and runoff from the other surface parking area will be collected in a deep sump catch basin, both of which are conveyed through a water quality unit before being directed to the underground infiltration system. This underground infiltration system will overflow via a flared end section to the northwest. Based upon previous soil investigations on site by others, the estimated seasonal high groundwater elevation is approximately 3.0. As such the infiltration system has been set with a bottom elevation of 5.0 to provide the minimum 2-feet of clearance above groundwater.

Stormwater runoff from the driveway into the garage below the building will be collected via a trench drain and conveyed through a water quality unit before being directed to a second underground infiltration system located directly south of this area. No credit has been taken for recharge from this infiltration system as, due to grades of the driveway, insufficient clearance from estimated seasonal high groundwater exists. This infiltration system will overflow via a flared end section to the area directly south of the proposed building.



To provide emergency access to the sides and rear of the building, a reinforced grass access lane will be installed. A portion of this access lane will include a 6-foot wide, porous asphalt walkway to allow residents to have ADA/AAB accessible access the rear of the site including the play area. Both the reinforced grass and porous asphalt will allow stormwater runoff to freely infiltrate back to the ground and will result in negligible runoff.

Specifics of the project's compliance with the Stormwater Standards are discussed in detail in the following sections.



SECTION 2.0

DRAINAGE SUMMARY



2.01 Stormwater Standard 1 – New Stormwater Conveyances

Per Massachusetts Stormwater Management Standard #1, no new outfalls may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. No new untreated stormwater discharges are proposed. Rip-rap outlet protection sizing calculations are included in Section 6.0 of this Report.

2.02 Stormwater Standard 2 – Stormwater Runoff Rates

Watershed modeling was performed using HydroCAD Stormwater Modeling Software version 10.00, a computer aided design program that combines SCS runoff methodology with standard hydraulic calculations. A model of the site's hydrology was developed for both pre and post-development conditions to assess the effects of the proposed development on the project site and surrounding areas.

The stormwater management system for the project has been designed such that the post-development conditions result in no increase to peak runoff rates to the adjacent wetlands or the adjacent public street for the 2, 10, 25, 50, and 100-year, 24-hour storm events, as detailed in the table below.

Peak Flow Discharge Rates

Node 1S/1L – Flow to Wetlands

Storm Event	Pre-Development Peak Discharge Rate (cfs)	Post-Development Peak Discharge Rate (cfs)	Change in Peak Discharge Rate (cfs)
2-Year	2.1	1.6	-0.5
10-Year	5.4	4.2	-1.2
25-Year	8.3	6.2	-2.1
50-Year	11.3	8.2	-3.1
100-Year	14.9	12.6	-2.3

Node 2S/2L - Flow to Street

Storm Event	Pre-Development Peak Discharge Rate (cfs)	Post-Development Peak Discharge Rate (cfs)	Change in Peak Discharge Rate (cfs)
2-Year	0.2	0.2	0.0
10-Year	0.4	0.4	0.0
25-Year	0.6	0.6	0.0
50-Year	0.8	0.8	0.0
100-Year	1.1	1.0	-0.1

2.03 Stormwater Standard 3 – Groundwater Recharge

Groundwater recharge is provided on site via an underground structural infiltration system beneath the surface parking area to the west of the building. Overall, the project will result in no loss of annual recharge to groundwater as required by Standard 3. Refer to Section 6.0 of this Report for groundwater recharge information.



2.04 Stormwater Standard 4 – TSS Removal

As a new development, the Project stormwater management system will achieve a TSS removal greater than 80%. The proposed stormwater management system has been designed to provide treatment of runoff in order to reduce suspended solids prior to discharge off-site through the implementation of the following best management practices:

- Deep Sump Hooded Catch Basins
- Proprietary Hydrodynamic Separator
- Underground Stormwater Infiltration System

The water quality volume is defined as the runoff volume requiring TSS Removal for the site, and is equal to 0.5-inches of runoff over the total impervious area of the post-development site. The required water quality volume for the project is provided in Section 6.0 of this Report

The underground infiltration system has been sized to treat the required water quality volume and calculations are included in Section 6.0 of this Report.

A long-term pollution prevention plan complying with the requirements of Standard 4 is included in Section 4.0 of this Report.

2.05 Stormwater Standard 5 – Land Uses with Higher Potential Pollutant Loads

This standard is not applicable as the project site is not a land use with higher potential pollutant loads (LUHPPL).

2.06 Stormwater Standard 6 – Stormwater Discharges to a Critical Area

This standard is not applicable as runoff from the project site does not discharge to a critical area.

2.07 Stormwater Standard 7 – Redevelopment Projects

This project is a new development and therefore has been designed to fully comply with the Stormwater Management Standards.

2.08 Stormwater Standard 8 – Sedimentation and Erosion Control Plan

Erosion and sedimentation controls are shown on the Project Plans. Additionally, a Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan is included in Section 3.0 of this Report.

2.09 Stormwater Standard 9 – Long Term Operation and Maintenance Plan

A Long-Term Operation and Maintenance Plan is included in Section 4.0 of this Report.

2.10 Stormwater Standard 10 – Illicit Discharges

There are no known illicit discharges on the project site and none are proposed.

2.11 Conclusion

The project has been designed in accordance with DEP Stormwater Management Standards and the Town of Arlington Wetlands Protection Bylaw and Regulations. Through the construction of the aforementioned stormwater systems, the project will provide peak rate attenuation, TSS removal and groundwater recharge.



2.12 Compensatory Flood Storage

A portion of the project site is located within the 1% Chance Annual Flood as defined by FEMA, which is regulated under the Wetlands Protection Act and Arlington Wetlands Bylaw as Bordering Land Subject to Flooding (BLSF). In order to protect the values provided by BLSF and prevent downstream flooding impacts, the project is required to provide compensatory flood storage on a 1-foot incremental basis to match whatever is lost due to the project's development. Further, Arlington requires compensatory flood storage to be provided at a 2 to 1 ratio for any flood storage lost. In order to provide this compensatory flood storage, the project will minimize the area of BLSF impacted and regrade a portion of the project property southeast of the proposed building as shown on the Plans. A breakdown of the flood storage impacts and compensatory storage provided is shown below:

Elevations	Existing Incremental Available Flood Stoage (CU.FT.)	Incremental Available Flood Stoage with No Compensatory Storage (CU.FT.)	Incremental Flood Storage Change w/No Compensatory Storage (CU.FT.)	Proposed Incremental Compensatory Storage (CU.FT.)	Ratio of Compensatory Storage to Storage Lost
5.0 - 6.0	67.0	0.0	-67.0	144.5	2.2
6.0 - 6.8	7,454.0	4,806.8	-2,647.2	5,990.0	2.3

As shown above, the project will exceed the 2 to 1 ratio of compensatory flood storage for all flood storage lost due to the project development. In addition, as shown on the Plans, the proposed compensatory storage is hydrologically connected to the flood plain impacted by the project. Therefore, the project as proposed meets the applicable requirements for BLSF in both the Wetlands Protection Act and the Arlington Wetlands Bylaw and Regulations.



SECTION 3.0

CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL PLAN

3.0 CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL PLAN

This Section specifies requirements and suggestions for implementation of a Stormwater Pollution Prevention Plan (SWPPP) for **Thorndike Place**, in Arlington, Massachusetts. The SWPPP shall be provided and maintained on-site by the Contractor(s) during all construction activities. The SWPPP shall be updated as required to reflect changes to construction activity.

The stormwater pollution prevention measures contained in the SWPPP shall be at least the minimum required by Local Regulations. The Contractor shall provide additional measures to prevent pollution from stormwater discharges in compliance with the National Pollution Discharge Elimination System (NPDES) Phase II permit requirements and all other local, state and federal requirements.

The SWPPP shall include provisions for, but not be limited to, the following:

- 1. Construction Trailers
- 2. Lay-down Areas
- 3. Equipment Storage Areas
- 4. Stockpile Areas
- Disturbed Areas

The Contractor shall NOT begin construction without submitting evidence that a NPDES Notice of Intent (NOI) governing the discharge of stormwater from the construction site for the entire construction period has been filed at least fourteen (14) days prior to construction. It is the Contractor's responsibility to complete and file the NOI, unless otherwise determined by the project team.

The cost of any fines, construction delays and remedial actions resulting from the Contractor's failure to comply with all provisions of local regulations and Federal NPDES permit requirements shall be paid for by the Contractor at no additional cost to the Owner.

As a requirement of the EPA's NPDES permitting program, each Contractor and Subcontractor responsible for implementing and maintaining stormwater Best Management Practices shall execute a Contractor's Certification form.

Erosion and Sedimentation Control

The Contractor shall be solely responsible for erosion and sedimentation control at the site. The Contractor shall utilize a system of operations and all necessary erosion and sedimentation control measures, even if not specified herein or elsewhere, to minimize erosion damage at the site to prevent the migration of sediment into environmentally sensitive areas. Environmentally sensitive areas include all wetland resource areas within, and downstream of, the site, and those areas of the site that are not being altered.

Erosion and sedimentation control shall be in accordance with this Section, the design drawings, and the following:

- □ "National Pollutant Discharge Elimination System General Permit for Discharges from Construction Activities (EPA Construction General Permit February 16, 2017).
- ☐ Massachusetts Stormwater Management Policy Handbook issued by the Massachusetts Department of Environmental Protection, January 2008.
- ☐ Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, A Guide for Planners, Designers and Municipal Officials, March 1997.

The BMP's presented herein should be used as a guide for erosion and sedimentation control and are <u>not</u> intended to be considered specifications for construction. The most important BMP is maintaining a rapid



construction process, resulting in prompt stabilization of surfaces, thereby reducing erosion potential. Given the primacy of rapid construction, these guidelines have been designed to allow construction to progress with essentially no hindrance by the erosion control methods prescribed. These guidelines have also been designed with sufficient flexibility to allow the Contractor to modify the suggested methods as required to suit seasonal, atmospheric, and site-specific physical constraints.

Another important BMP is the prevention of concentrated water flow. Sheet flow does not have the erosive potential of a concentrated rivulet. These guidelines recommend construction methods that allow localized erosion control and a system of construction, which inhibits the development of shallow concentrated flow. These BMP's shall be maintained throughout the construction process.

CONTACT INFORMATION AND RESPONSIBLE PARTIES

The following is a list of all project-associated parties:

Owner

Arlington Land Realty, LLC 84 Sherman Street, 2nd Floor Cambridge, MA 02140

Contractor

To be determined

Environmental Consultant

BSC Group, Inc. 803 Summer Street Boston, MA 02127

Contact: John Hession, P.E.

Phone: (617) 896-4300

Email: jhession@bscgroup.com

Qualified SWPPP Inspectors

To Be Determined

3.1 Procedural Conditions of the Construction General Permit (CGP)

The following list outlines the Stormwater Responsibilities for all construction operators working on the Project. The operators below agree through a cooperative agreement to abide by the following conditions throughout the duration of the construction project, effective the date of signature of the required SWPPP. These conditions apply to all operators on the project site.

The project is subject to EPA's NPDES General Permit through the CGP. The goal of this permit is to prevent the discharge of pollutants associated with construction activity from entering the existing and proposed storm drain system or surface waters.

All contractors/operators involved in clearing, grading and excavation construction activities must sign the appropriate certification statement required, which will remain with the SWPPP. The owner must also sign a certification, which is to remain with the SWPPP in accordance with the signatory requirements of the SWPPP.



Once the SWPPP is finalized, a signed copy, plus supporting documents, must be held at the project site during construction. A copy must remain available to EPA, State and Local agencies, and other interested parties during normal business hours.

The following items associated with this SWPPP must be posted in a prominent place at the construction site until final stabilization has been achieved:

- The completed/submitted NOI form
- Location where the public can view the SWPPP during normal business hours
- A copy of the signed/submitted NOI, permit number issued by the EPA and a copy of the current CGP.

Project specific SWPPP documents are not submitted to the US EPA unless the agency specifically requests a copy for review. SWPPP documents requested by a permitting authority, the permitee(s) will submit it in a timely manner.

EPA inspectors will be allowed free and unrestricted access to the project site and all related documentation and records kept under the conditions of the permit.

The permitee is expected to keep all BMP's and Stormwater controls operating correctly and maintained regularly.

Any additions to the project which will significantly change the anticipated discharges of pollutants, must be reported to the EPA. The EPA should also be notified in advance of any anticipated events of noncompliance. The permitee must also orally inform the EPA of any discharge, which may endanger health or the environment within 24 hours, with a written report following within 5 days.

In maintaining the SWPPP, all records and supporting documents will be compiled together in an orderly fashion. Inspection reports and amendments to the SWPPP must remain with the document. Federal regulations require permitee(s) to keep their Project Specific SWPPP and all reports and documents for at least three (3) years after the project is complete.

3.2 Existing Site and Soil Conditions

The total project area is approximately 17.66 acres and is located off of Dorothy Road. The project is bounded on the north by Dorothy Road, bounded on the east by residential properties, and bounded on the south and west by Concord Turnpike (Route 2).

The current site is comprised of forest and the primary soil classification identified by the NRCS Web Soil Survey is udorthents (655), which accounts for the majority of the property and all of the project area. As such, the soils have been modeled as Hydrologic Soil Group C.

3.3 Project Description and Intended Construction Sequence

The site is currently comprised of woods. The proposed activities will include the following major components:

- The construction of one (1) multi-family housing building with associated parking, driveways, and walkways,
- The construction of stormwater management systems, and
- Site grading, and utility installation.

The proposed project will disturb a total of approximately 138,233± S.F. (3.17± acres).

Soil disturbing activities will include site demolition, installing stabilized construction exits, installation of erosion and sedimentation controls, grading, storm drain inlets, stormwater management systems, utilities,



building foundation, construction of site driveways and preparation for final landscaping. Please refer to Table 1 for the projects anticipated construction timetable. A description of BMP's associated with project timetable and construction-phasing elements is provided in this Erosion and Sediment Control Plan.

Table 1 – Anticipated Construction Timetable

Construction Phasing Activity	Anticipated Timetable
Grubbing and Stripping of Limits of	To be determined
Construction Phase	
Rough Site Grading and Site Utilities	To be determined
Utility Plan Construction	To be determined
Landscaping	To be determined

3.4 Potential Sources of Pollution

Any project site activities that have the potential to add pollutants to runoff are subject to the requirements of the SWPPP. Listed below are a description of potential sources of pollution from both sedimentation to Stormwater runoff, and pollutants from sources other than sedimentation.

Table 2 – Potential Sources of Sediment to Stormwater Runoff

Table 2 – I otential Sources	Table 2 – Potential Sources of Sediment to Stormwater Runoff				
Potential Source	Activities/Comments				
Construction Site Entrance and	Vehicles leaving the site can track soils onto public				
Site Vehicles	roadways. Site Vehicles can readily transport exposed soils				
	throughout the site and off-site areas.				
Grading Operations	Exposed soils have the potential for erosion and discharge of				
	sediment to off-site areas.				
Material Excavation, Relocation,	Stockpiling of materials during excavation and relocation of				
and Stockpiling	soils can contribute to erosion and sedimentation. In				
	addition, fugitive dust from stockpiled material, vehicle				
	transport and site grading can be deposited in wetlands and				
	waterway.				
Landscaping Operations	Landscaping operations specifically associated with exposed				
	soils can contribute to erosion and sedimentation.				
	Hydroseeding, if not properly applied, can runoff to adjacent				
	wetlands and waterways.				

Table 3 – Potential Pollutants and Sources, other than Sediment to Stormwater Runoff

Potential Source	Activities/Comments
Staging Areas and Construction	Vehicle refueling, minor equipment maintenance, sanitary
Vehicles	facilities and hazardous waste storage
Materials Storage Area	General building materials, solvents, adhesives, paving materials, paints, aggregates, trash, etc.
Construction Activities	Construction, paving, curb/gutter installation, concrete pouring/mortar/stucco

3.5 Erosion and Sedimentation Control Best Management Practices

All construction activities will implement Best Management Practices (BMP's) in order to minimize overall site disturbance and impacts to the sites natural features. Please refer to the following sections for a detailed description of site specific BMP's. In addition, an Erosion and Sedimentation Control Plan is provided in the Site Plans.



3.6 Timetable and Construction Phasing

This section provides the Owner and Contractor with a suggested order of construction that shall minimize erosion and the transport of sediments. The individual objectives of the construction techniques described herein shall be considered an integral component of the project design intent of each project phase. The construction sequence is not intended to prescribe definitive construction methods and should not be interpreted as a construction specification document. However, the Contractor shall follow the general construction phase principles provided below:

- Protect and maintain existing vegetation wherever possible.
- Minimize the area of disturbance.
- To the extent possible, route unpolluted flows around disturbed areas.
- Install mitigation devices as early as possible.
- Minimize the time disturbed areas are left unstabilized.
- Maintain siltation control devices in proper condition.
- The contractor should use the suggested sequence and techniques as a general guide and modify
 the suggested methods and procedures as required to best suit seasonal, atmospheric, and site
 specific physical constraints for the purpose of minimizing the environmental impact of
 construction.

Demolition, Grubbing and Stripping of Limits of Construction Phase

- Install Temporary Erosion Control (TEC) devices as required to prevent sediment transport into resource areas.
- Place a ring of silt socks and/or haybales around stockpiles.
- Stabilize all exposed surfaces that will not be under immediate construction.
- Store and/or dispose all pavement and building demolition debris as indicated in accordance with all applicable local, state, and federal regulations.

Driveway Area Sub-Base Construction

- Install temporary culverts and diversion ditches and additional TEC devices as required by individual construction area constraints to direct potential runoff toward detention areas designated for the current construction phase.
- Compact gravel as work progresses to control erosion potential.
- Apply water to control air suspension of dust.
- Avoid creating an erosive condition due to over-watering.
- Install piped utility systems as required as work progresses, keeping all inlets sealed until all downstream drainage system components are functional.

Binder Construction

- Fine grade gravel base and install processed gravel to the design grades.
- Compact pavement base as work progresses.
- Install payement binder coat starting from the downhill end of the site and work toward the top.

Finish Paving

- Repair and stabilize damaged side slopes.
- Clean inverts of drainage structures.
- Install final top coat of pavement.



Final Clean-up

- Clean inverts of culverts and catch basins.
- Remove sediment and debris from rip-rap outlet areas.
- Remove TEC devices only after permanent vegetation and erosion control has been fully established.

3.7 Site Stabilization

Grubbing Stripping and Grading

- Erosion control devices shall be in place as shown on the design plans before grading commences.
- Stripping shall be done in a manner, which will not concentrate runoff. If precipitation is expected, earthen berms shall be constructed around the area being stripped, with a silt sock, silt fence or haybale dike situated in an arc at the low point of the berm.
- If intense precipitation is anticipated, silt socks, haybales, dikes and /or silt fences shall be used as required to prevent erosion and sediment transport. The materials required shall be stored on site at all time.
- If water is required for soil compaction, it shall be added in a uniform manner that does not allow excess water to flow off the area being compacted.
- Dust shall be held at a minimum by sprinkling exposed soil with an appropriate amount of water.

Maintenance of Disturbed Surfaces

- Runoff shall be diverted from disturbed side slopes in both cut and fill.
- Mulching may be used for temporary stabilization.
- Silt sock, haybale or silt fences shall be set where required to trap products of erosion and shall be maintained on a continuing basis during the construction process.

Loaming and Seeding

- Loam shall not be placed unless it is to be seeded directly thereafter.
- All disturbed areas shall have a minimum of 4" of loam placed before seeded and mulched.
- Consideration shall be given to hydro-mulching, especially on slopes in excess of 3 to 1.
- Loamed and seeded slopes shall be protected from washout by mulching or other acceptable slope protection until vegetation begins to grow.

Stormwater Collection System Installation

- The Stormwater drainage system shall be installed from the downstream end up and in a manner which will not allow runoff from disturbed areas to enter pipes.
- Excavation for the drainage system shall not be left open when rainfall is expected overnight. If left open under other circumstances, pipe ends shall be closed by a staked board or by an equivalent method.
- All catch basin openings shall be covered by a silt bag between the grate and the frame or protected from sediment by silt fence surrounding the catch basin grate.

Completion of Paved Areas

- During the placement of sub-base and pavement, the entrance to the Stormwater drainage systems shall be sealed when rain is expected. When these entrances are closed, consideration must be given to the direction of run-off and measures shall be undertaken to minimize erosion and to provide for the collection of sediment.
- In some situations it may be necessary to keep catch basins open.



• Appropriate arrangements shall be made downstream to remove all sediment deposition.

Stabilization of Surfaces

- Stabilization of surfaces includes the placement of pavement, rip-rap, wood bark mulch and the establishment of vegetated surfaces.
- Upon completion of construction, all surfaces shall be stabilized even though it is apparent that future construction efforts will cause their disturbance.
- Vegetated cover shall be established during the proper growing season and shall be enhanced by soil adjustment for proper pH, nutrients and moisture content.
- Surfaces that are disturbed by erosion processes or vandalism shall be stabilized as soon as possible.
- Areas where construction activities have permanently or temporarily ceased shall be stabilized within 14 days from the last construction activity, except when construction activity will resume within 21 days (e.g., the total time period that construction activity is temporarily ceased is less than 21 days).
- Hydro-mulching of grass surfaces is recommended, especially if seeding of the surfaces is required outside the normal growing season.
- Hay mulch is an effective method of temporarily stabilizing surfaces, but only if it is properly secured by branches, weighted snow fences or weighted chicken wire.

3.8 Temporary Structural Erosion Control Measures

Temporary erosion control measures serve to minimize construction-associated impacts to wetland resource and undisturbed areas. Please refer to the following sections for a description of temporary erosion control measures implemented as part of the project and this sample SWPPP.

3.8.1 Silt Socks, Haybales, and Silt Fencing

The siltation barriers will demarcate the limit of work, form a work envelope and provide additional assurance that construction equipment will not enter the adjacent wetlands or undisturbed portions of the site. All barriers will remain in place until disturbed areas are stabilized.

3.8.2 Temporary Stormwater Diversion Swale

A temporary diversion swale is an effective practice for temporarily diverting stormwater flows and to reduce stormwater runoff velocities during storm events. The swale channel can be installed before infrastructure construction begins at the site, or as needed throughout the construction process. The diversion swale should be routinely compacted or seeded to minimize the amount of exposed soil.

3.8.3 Dewatering Basins

Dewatering may be required during stormwater system, foundation construction and utility installation. Should the need for dewatering arise, groundwater will be pumped directly into a temporary settling basin, which will act as a sediment trap during construction. All temporary settling basins will be located within close proximity of daily work activities. Prior to discharge, all groundwater will be treated by means of the settling basin or acceptable substitute. Discharges from sediment basins will be free of visible floating, suspended and settleable solids that would impair the functions of a wetland or degrade the chemical composition of the wetland resource area receiving ground or surface water flows and will be to the combined system.

3.8.4 Material Stockpiling Locations

Piping and trench excavate associated with the subsurface utility work will be contained with a single row of silt socks and/or haybales.



3.9 Permanent Structural Erosion Control Measures

Permanent erosion control measures serve to minimize post-construction impacts to wetland resource areas and undisturbed areas. Please refer to the Site Plans and Long-Term Operations and Maintenance Plan for a description of permanent erosion control measures implemented as part of the project and this SWPPP.

3.10 Good Housekeeping Best Management Practices

3.10.1 Material Handling and Waste Management

Solid waste generation during the construction period will be primarily construction debris. The debris will include scrap lumber (used forming and shoring pallets and other shipping containers), waste packaging materials (plastic sheeting and cardboard), scrap cable and wire, roll-off containers (or dumpsters) and will be removed by a contract hauler to a properly licensed landfill. The roll-off containers will be covered with a properly secured tarp before the hauler exits the site. In addition to construction debris, the construction work force will generate some amount of household-type wastes (food packing, soft drink containers, and other paper). Trash containers for these wastes will be located around the site and will be emptied regularly so as to prevent wind-blown litter. This waste will also be removed by a contract hauler.

All hazardous waste material such as oil filters, petroleum products, paint and equipment maintenance fluids will be stored in structurally sound and sealed shipping containers in the hazardous-materials storage area and segregated from other non-waste materials. Secondary containment will be provided for all materials in the hazardous materials storage area and will consist of commercially available spill pallets. Additionally, all hazardous materials will be disposed of in accordance with federal, state and municipal regulations.

Two temporary sanitary facilities (portable toilets) will be provided at the site in the combined staging area. The toilets will be away from a concentrated flow path and traffic flow and will have collection pans underneath as secondary treatment. All sanitary waste will be collected from an approved party at a minimum of three times per week.

3.10.2 Building Material Staging Areas

Construction equipment and maintenance materials will be stored at the combined staging area and materials storage areas. Silt fence will be installed around the perimeter to designate the staging and materials storage area. A watertight shipping container will be used to store hand tools, small parts and other construction materials.

Non-hazardous building materials such as packaging material (wood, plastic and glass) and construction scrap material (brick, wood, steel, metal scraps, and pine cuttings) will be stored in a separate covered storage facility adjacent to other stored materials. All hazardous-waste materials such as oil filters, petroleum products, paint and equipment maintenance fluids will be stored in structurally sound and sealed containers under cover within the hazardous materials storage area.

Large items such as framing materials and stockpiled lumber will be stored in the open storage area. Such materials will be elevated on wood blocks to minimize contact with runoff.

The combined storage areas are expected to remain clean, well-organized and equipped with ample cleaning supplies as appropriate for the materials being stored. Perimeter controls such as containment structures, covers and liners will be repaired or replaced as necessary to maintain proper function.

3.10.3 Designated Washout Areas

Designated temporary, below-ground concrete washout areas will be constructed, as required, to minimize the pollution potential associated with concrete, paint, stucco, mixers etc. Signs will, if required, be posted marking the location of the washout area to ensure that concrete equipment operators use the proper facility.



Concrete pours will not be conducted during or before an anticipated precipitation event. All excess concrete and concrete washout slurries from the concrete mixer trucks and chutes will be discharged to the washout area or hauled off-site for disposal.

3.10.4 Equipment/Vehicle Maintenance and Fueling Areas

Several types of vehicles and equipment will be used on-site throughout the project including graders, scrapers, excavators, loaders, paving equipment, rollers, trucks and trailers, backhoes and forklifts. All major equipment/vehicle fueling and maintenance will be performed off-site. A small, 20-gallon pickup bed fuel tank will be kept on-site in the combined staging area. When vehicle fueling must occur on-site, the fueling activity will occur in the staging area. Only minor equipment maintenance will occur on-site. All equipment fluids generated from maintenance activities will be disposed of into designated drums stored on spill pallets. Absorbent, spill-cleanup materials and spill kits will be available at the combined staging and materials storage area. Drip pans will be placed under all equipment receiving maintenance and vehicles and equipment parked overnight.

3.10.5 Equipment/Vehicle Wash down Area

All equipment and vehicle washing will be performed off-site.

3.10.6 Spill Prevention Plan

A spill containment kit will be kept on-site in the Contractor's trailer and/or the designated staging area throughout the duration of construction. Should there be an accidental release of petroleum product into a resource area, the appropriate agencies will be immediately notified.

3.10.7 Inspections

Maintenance of existing and proposed BMP's to address stormwater management facilities during construction is an on-going process. The purpose of the inspections is to observe all sources of stormwater or non-stormwater discharge as identified in the SWPPP as well as the status of the receiving waters and fulfill the requirements of the Order of Conditions. The following sections describe the appropriate inspection measures to adequately implement the project's SWPPP. A blank inspection form is provided at the end of this section. Completed inspection forms are to be maintained on site.

Inspection Personnel

The owner's appointed representative will be responsible for performing regular inspections of erosion controls and ordering repairs as necessary.

Inspection Frequency

Inspections will be performed by qualified personnel once every 7 days and within 24-hours after a storm event of greater than one-quarter inch, in accordance with the CGP. The inspections must be documented on the inspection form provided at the end of this section, and completed forms will be provided to the onsite supervisor and maintained at the Owner's office throughout the entire duration of construction.

Inspection Reporting

Each inspection report will summarize the scope of the inspection, name(s) and qualifications of personnel making the inspection, and major observations relating to the implementation of the SWPPP, including compliance and non-compliance items. Completed inspection reports will remain with the completed SWPPP on site.



3.10.8 Amendment Requirements

The final SWPPP is intended to be a working document that is utilized regularly on the construction site, and provides guidance to the Contractor. It must reflect changes made to the originally proposed plan and will be updated to include project specific activities and ensure that they are in compliance with the NPDES General Permit and state and local laws and regulations. It should be amended whenever there is a change in design, construction, operation or maintenance that affects discharge of pollutants. The following items should be addressed should an amendment to the SWPPP occur:

- Dates of certain construction activities such as major grading activities, clearing and initiation of and completion of stabilization measures should be recorded.
- Future amendments to the SWPPP will be recorded as required. As this SWPPP is amended, all amendments will be kept on site and made part of the SWPPP.
- Upon completion of site stabilization (completed as designed and/or 70% background vegetative cover), it can be documented and marked on the plans. Inspections are no longer required at this time.
- Inspections often identify areas not included in the original SWPPP, which will require the SWPPP to be amended. These updates should be made within seven days of being recognized by the inspector.

3.11 SWPPP Inspection and Maintenance Report

The following form is an example to be used for SWPPP Inspection Reporting.



Stormwater Construction Site Inspection and Maintenance Report

TO BE COMPLETED AT LEAST EVERY 7 DAYS AND WITHIN 24 HOURS OF A STORM EVENT OF AT LEAST 0.25 INCHES. AFTER SITE STABILIZATION, TO BE COMPLETED AT LEAST ONCE PER MONTH FOR THREE YEARS OR UNTIL A NOTICE OF TERMINATION IS FILED (IF APPLICABLE).

General Information						
Project Name	Thorndike Place					
NPDES Tracking No.		Location	Dorothy Road			
(if applicable)			Arlington, MA			
Date of Inspection		Start/End Time				
Inspector's Name(s)						
Inspector's Title(s)						
Inspector's Contact Information						
Inspector's Qualifications						
Describe present phase of construction						
Type of Inspection: ☐ Regular ☐ Pre-storm event	☐ During storm event	☐ Post-storm e	vent			
Weather Information						
Has there been a storm event since	the last inspection?	s 🗖 No				
If yes, provide:						
Storm Start Date & Time: S	torm Duration (hrs):	Approximate	Amount of Precipitation (in):			
Weather at time of this inspection?	?					
J	☐ Sleet ☐ Fog ☐ Sno	owing 🔲 High Win	ds			
Other:	Temperature:					
Have any discharges occurred since the last inspection? □Yes □No If yes, describe:						
Are there any discharges at the tin If yes, describe:	ne of inspection? □Yes □	lNo				

Site-specific BMPs

Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.

Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective

	Action Log.			
	ВМР	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes Action required by whom and when
1	Catch Basin Protection	□Yes □No	□Yes □No	
2	Haybale & Silt Fencing	□Yes □No	□Yes □No	
3	Straw Wattles	□Yes □No	□Yes □No	
4	Construction Entrance	□Yes □No	□Yes □No	
5	Sediment Basins	□Yes □No	□Yes □No	
6	Dewatering Pit	□Yes □No	□Yes □No	
7		□Yes □No	□Yes □No	

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes Action required by whom and when
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	□Yes □No	□Yes □No	,
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	□Yes □No	□Yes □No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	□Yes □No	□Yes □No	
4	Are discharge points and receiving waters free of any sediment deposits?	□Yes □No	□Yes □No	
5	Are storm drain inlets properly protected?	□Yes □No	□Yes □No	
6	Is the construction exit preventing sediment from being tracked into the street?	□Yes □No	□Yes □No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	□Yes □No	□Yes □No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	□Yes □No	□Yes □No	
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	□Yes □No	□Yes □No	Vehicle Maintenance not allowed on site
10	Are materials that are potential stormwater	□Yes □No	□Yes □No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes Action required by whom and when				
	contaminants stored inside or under cover?		•	•				
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	□Yes □No	□Yes □No					
12	(Other)	□Yes □No	□Yes □No					
			Non-Compli	ance				
Desc	cribe any incidents of non-c	ompliance not des	cribed above:					
		CEI	RTIFICATION S	TATEMENT				
Based informathere	"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."							
Print (Qual	name and title:ified Person Performing the	e Inspection)						
Signa	ture:			Date:				
Print (Cont	name and title:ractor/Operator)							
Signa	ture:			Date:				

SECTION 4.0

LONG-TERM POLLUTION PREVENTION & OPERATION AND MAINTENANCE PLAN

4.0 Long-Term Pollution Prevention & Operation and Maintenance Plan

As required by Standard #4 of the Stormwater Management Policy, this Long-Term Pollution Prevention Plan has been developed for source control and pollution prevention at the site after construction.

MAINTENANCE RESPONSIBILITY

Ensuring that the provisions of the Long-Term Pollution Prevention Plan are followed will be the responsibility of The Applicant, Arlington Land Realty, LLC.

GOOD HOUSEKEEPING PRACTICES

The site to be kept clean of trash and debris at all times. Trash, junk, etc. is not to be left outside.

VEHICLE WASHING CONTROLS

The following BMP's, or equivalent measures, methods or practices are required if you are engaged in vehicle washing and/or steam cleaning:

It is allowable to rinse down the body or a vehicle, including the bed of a truck, with just water without doing any wash water control BMP's.

If you wash (with mild detergents) on an area that infiltrates water, such as gravel, grass, or loose soil, it is acceptable to let the wash water infiltrate as long as you only wash the body of vehicles.

However, if you wash on a paved area and use detergents or other cleansers, or if you wash/rinse the engine compartment or the underside of vehicles, you must take the vehicles to a commercial vehicle wash.

REQUIREMENTS FOR ROUTINE INSPECTIONS AND MAINTENANCE OF STORMWATER BMPS

All stormwater BMPs are to be inspected and maintain as follows;

Haybales, Silt Fence, and other temporary measures

The temporary erosion control measures will be installed up gradient of any wetland resource area where any disturbance or alteration might otherwise allow for erosion or sedimentation. They will be regularly inspected to ensure that they are functioning adequately. Additional supplies of these temporary measures will be stockpiled on site for any immediate needs or routine replacement.

Deep Sump Hooded Catch Basins

Regular maintenance is essential. Catch basins remain effective at removing pollutants only if they are cleaned out frequently. Inspect or clean basins at least four times per year and at the end of the foliage and snow removal seasons. Sediments must also be removed four times per year or whenever the depth of the deposits in the catch basin sump is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin.

Water Quality Treatment Units

The water quality treatment structures require periodic inspection and cleaning to maintain operation and function. Owners should have these units inspected on a semi-annual basis and after periods of intense precipitation. Inspections can be done by using a clear Plexiglas tube ("sludge judge") to extract a water column sample. When sediment accumulation reaches 15% of storage capacity, cleaning of the unit is required.

These water quality structures must and will be checked and cleaned immediately after petroleum spills; contact appropriate regulatory agencies.

Maintenance of these units should be done by a vacuum truck that will remove the water, sediment, debris, floating hydrocarbons and other materials in unit. Proper cleaning and disposal of the removed materials and liquid must be followed.

Underground Infiltration System

Maintenance is required for the proper operation of the underground infiltration system. Infiltration systems are prone to failure due to clogging if the upstream water quality units are not maintained. The use of pretreatment BMPs will minimize failure and maintenance requirements.

After construction, the infiltration system shall be inspected after every major storm for the first few months to ensure proper stabilization and function. Water levels in the access ports shall be recorded over several days to check the drainage of the systems. It is recommended that a log book be maintained showing the depth of water in the detention/infiltration systems at each observation in order to determine the rate at which the system dewaters after runoff producing storm events. Once the performance characteristics of the detention/infiltration have been verified, the monitoring schedule can be reduced to an annual basis, unless the performance data suggests that a more frequent schedule is required.

Preventive maintenance on the infiltration system shall be performed at least twice a year, and sediment shall be removed from any and all pretreatment and collection structures. Sediment shall be removed when deposits approach within six inches of the invert heights of connecting pipes between unit rows, or in sumped inlet structures. Ponded water inside the systems (as visible from the access ports) that remains after several days most likely indicates that the bottom of the system is clogged and will require cleaning or replacement.

The system is designed with a defined top portal area at the "down-flow" end of the chamber that can be cut out to accept up to a 10-inch diameter riser pipe. The 10-inch riser can be used as an observation well and as access for a vacuum truck tube for use in removing sediment. The "down flow" ends of the units have end walls that are closed on the bottom. The closed bottom functions like a coffer dam, with most of the sediment depositing prior to flowing into the next chamber, facilitating its removal through the riser pipe, which is positioned directly above this area.

Pipe Outlet Protection

The outlet protection should be checked at least annually and after every major storm. If the rip-rap has been displaced, undermined or damaged, it should be repaired immediately. The channel immediately below the outlet should be checked to see that erosion is not occurring. The downstream channel should be kept clear of obstructions such as fallen trees, debris, and sediment that could change flow patterns and/or tailwater depths on the pipes. Repairs must be carried out immediately to avoid additional damage to the outlet protection apron.

PROVISIONS FOR MAINTENANCE OF LAWNS, GARDENS AND OTHER LANDSCAPE AREAS

Suggested Maintenance Operations

A. Trees and Shrubs

Disease and Pest Management - Prevention of disease or infestation is the first step of Pest Management. A plant that is in overall good health is far less susceptible to disease. Good general landscape maintenance can reduce problems from disease.

Inspections of plant materials for signs of disease or infestation are to be performed monthly by the Landscape Maintenance Contractor's Certified Arborist. This is a critical step for early diagnosis. Trees and Shrubs that have been diagnosed to have a plant disease or an infestation of insect pests are to be treated promptly with an appropriate material by a licensed applicator.

Fertilization - Trees and shrubs live outside their natural environment and should be given proper care to maintain health and vigor. Fertilizing trees and shrubs provides the plants with nutrients needed to resist insect attack, to resist drought and to grow thicker foliage. Fertilizing of new and old trees may be done in one of three ways, in either the early spring or the late fall.

• Systemic Injection of new and existing trees on trees 2 inches or greater in diameter. You must be licensed to apply this method.

- Soil Injection a liquid fertilizer with a product such as Arbor Green or Rapid Grow injected into the soil under the drip zone of a tree or shrub. Material must be used according to manufacturers' specifications to be effective. Outside contracting is recommended.
- Punch Bar Method a dry fertilizer such as 10-10-10, may be used by punched holes in the drip zone of the tree 12-18" deep, two feet apart around the circumference, to the edge of the drip line. Three pounds of fertilizer should be used per diameter inch for trees with trunks six inches or more in diameter.
- Fertilizer of shrubs use a fertilizer such as 10-10-10, broadcast over the planting area according to the manufacturers' rate and water in.
- All fertilization must be noted on daily maintenance log.

Watering - Trees and Shrubs will need supplemental watering to remain in vigorous health. All new plants need to be watered once a week in cool weather, twice a week during warm weather, and up to three times in a week during periods of extreme heat and drought. Trees and shrubs should be watered in such a manner as to totally saturate the soil in the root zone area. Over-watering or constant saturation of the soil must be avoided as this could lead to root rot and other disease problems. The use of a soil moisture meter can help you monitor the soil's water intake.

Plant Replacement - Unhealthy plants that may cause widespread infestation of other nearby plants shall be immediately removed from the site. Any vegetation removed from the site must be recorded and submitted with the daily maintenance log. The area shall be treated to prevent further infestation. The plant shall then be replaced with a healthy specimen of the same species and size. This work shall have a pre-established budget allowance for the year.

A spring inspection of all plant materials shall be performed to identify those plant materials that are not in vigorously healthy condition. Unhealthy plant materials shall be evaluated. If the problem is determined to be minor the plant material shall be given appropriate restorative care in accordance with this maintenance guideline until it is restored to a vigorously healthy condition. Unhealthy plant materials that do not respond to restorative care or are determined to be beyond saving shall be replaced with a healthy specimen of the same species and size. In the case of the necessity of replacing extremely large plant materials the Landscape Architect shall determine the size of the replacement plant.

Pruning - Proper pruning is the selective removal of branches without changing the plant's natural appearance, or habit of growth. All tree pruning is to be performed by a licensed Arborist. All branches that are dead, broken, scared or crossing should be removed. All cuts should be made at the collar and not cut flush with the base.

Pruning on the site shall be done for the following purposes;

- To maintain or reduce the size of a tree or shrub
- To remove dead, diseased or damaged branches
- To rejuvenate old shrubs and encourage new growth
- To stimulate future flower and fruit development
- To maximize the visibility of twig color
- To prevent damage and reduce hazards to people and properties

All shrubs are recommended to be pruned on an annual basis to prevent the shrub from becoming overgrown and eliminate the need for drastic pruning. There are several types of pruning for deciduous shrubs. Hand snips should be used to maintain a more natural look or hand shears can be used for a more formal appearance.

Winter Protection - All trees and shrubs are to be watered, fertilized, and mulched before the first frost. All stakes should be checked and ties adjusted. Damaged branches should be pruned.

Broadleaf and Coniferous Evergreen plant materials are to be sprayed with an anti-desiccant product to prevent winter burn. The application shall be repeated during a suitable mid-winter thaw.

Shrubs located in areas likely to be piled with snow during snow removal (but not designated as Snow Storage Areas) shall be marked by six-foot high poles with bright green banner flags. Stockpiles of snow are not to be located in these areas due to potential damage to the plant materials from both the weight of the snow and the snow melting chemicals.

At the fall landscape maintenance conference parameters will be discussed between the Landscape Maintenance Contractor and the snow removal contractor to assure minimal damage and loss of landscape amenities during the winter season.

Seasonal Clean Up - A thorough spring cleanup is to be performed. This includes the removal and replacement of dead or unhealthy plant materials and the cleanup of plant debris and any general debris that has accumulated over the winter season. Mulch is to be lightly raked to clean debris from the surface without removing any mulch. Twigs and debris are to be removed from the planting beds throughout the growing season.

Mulching - Planting beds shall be mulched with a treated shredded hardwood mulch free from dirt, debris, and insects. A sample of this mulch shall be given to the Owner for approval prior to installation.

Maintain a 2-3" maximum depth and keep free of weeds either by hand weeding or by the use of a pre-emergent weed control such as Treflan or Serfian. Seasonal re-mulching shall occur as necessary in the spring and the fall to maintain this minimum depth. When new mulch is added to the planting bed it shall be spread to create a total depth of no more than three inches. Edges should be maintained in a cleanly edged fashion.

Mulch shall not be placed directly against the trunk of any tree or shrub.

B. Groundcover and Perennials

Disease and Pest Management – Pesticides and herbicides should be applied only as problems occur, with the proper chemical applied only by a trained professional or in the case of pesticide, a Certified Pesticide Applicator. Plants should be monitored weekly and treated accordingly.

Fertilizer – The health of the plants can be maintained or improved, and their growth encouraged by an application of complete fertilizer. Apply a fertilizer such as 4-12-4 as growth becomes apparent and before mulching. Apply to all groundcover and perennial planting areas by hand and avoid letting the fertilizer come in contact with the foliage, or use a liquid fertilizer and apply by soaking the soil. Apply according to the manufacturers' specifications.

Fertilization shall stop at the end of July.

Water – Groundcovers and Perennials will need supplemental watering in order to become established, healthy plants. All new plants need to be watered once a week in cool weather, twice a week during warm weather, and up to three times in a week during periods of extreme heat and drought. Until established, groundcovers and perennials should be watered in such a manner as to totally saturate the soil in the root zone area, to a depth of 6 inches. Once established, perennials shall continue to be watered as necessary to maintain them in a vigorous healthy condition. Over-watering or constant saturation of the soil must be avoided as this could lead to root rot and other disease problems. The use of a soil moisture meter can help you monitor the soil's water intake.

On-site water shall be furnished by the Owner. Hose and other watering equipment shall be furnished by the Landscape Maintenance Contractor.

Replacement – Any unhealthy plant/s that may cause widespread infestation of other nearby plants shall be immediately removed from the site. Any vegetation removed from the site must be recorded and submitted with the landscape maintenance log. The area shall be treated to prevent further infestation. The plant/s shall then be replaced with healthy specimen/s of the same species and size. Old Forge shall have a pre-established budget allowance for this type of replacement, each year.

Plant material that is damaged as a result of other landscape maintenance activities, such as mowing, shall be replaced with healthy specimens of the same species and size, at no additional cost to the owner.

Deadheading – Perennials shall be checked on a weekly basis and dead-headed once flowers have faded or as necessary based on plant type and duration of flower. Spent flowers can be pinched off with the thumb and forefinger. Continue to remove all faded flowers until Fall. All associated debris shall be removed from site daily.

Staking – Upright-growing perennials need support especially when in flower. Use of bamboo stakes, galvanized wire hoops or mesh may be necessary for their support. Supports should be put in place before they have become too difficult to handle. The supports should not be taller than the mature height of the perennial plant.

Division of Perennials – Two or three-year-old perennials are easily divided in the spring if more plants are needed. To divide, cut out the entire section of plant to be divided, including roots. The larger divisions (those with three or more shoots), can be set out immediately in their permanent location, where they can be expected to bloom the same season. Smaller divisions are best planted in an out-of-the-way planting bed until the following autumn or spring, when they can be moved to their permanent location.

Weeding – All planting beds should be kept weed-free. Weed either by hand or with a pre-emergent herbicide such as Treflen used according to manufacturers' specifications. Manual weeding is to be used in combination with the use of spot applications of herbicides. Both live and dead weeds are to be pulled and removed from the site.

All herbicide applications shall be documented in the Landscape Maintenance Log. The actual product label or the manufacturer's product specification sheet for the specific product shall also be included in the Log.

Only personnel with appropriate applicator licenses shall supervise and/or perform the application of pesticide products requiring a license.

Winterizing – Perennial gardens should be cleaned-up when growth ceases in the fall. Remove foliage of plants that normally die down to the ground. Divide and replant over-grown clumps.

C. Lawn Areas - Turf Systems

Mowing – Proper mowing is an integral part of any good turf maintenance program. Without it, the finest in fertilization, watering and other vital maintenance practices would be completely ineffective. Proper mowing will help control dicot weeds; help the turf survive during periods of extreme heat, and gain strength and vigor to resist disease and other infestations.

Mowing height – The proper mowing height will vary somewhat according to the type of grass. The most common type of seed & sod lawns contain a mixture of bluegrass, fine fescue and perennial rye, which should be mowed at 2-3 inches.

Mowing frequency – The basic rule of thumb for mowing frequency is to never remove more than 1/3 of the grass blade in one mowing. Example: if you want to mow your turf at 2 inches, you should cut it when it reaches 3 inches. Removing more than ½ of the grass plant at a time can put the plant into shock, thus making it more susceptible to stress disease and weed infestation.

Mowing frequency will vary with the growing season and should be set by the plant height and not a set date. It will often be necessary to mow twice a week during periods of surge growth to help maintain plant health and color. Mowing should be cut back during periods of stress.

Grass clippings should be removed whenever they are thick enough to layer the turf. The return of clippings to the soil actually adds nutrients and helps retain moisture. Heavily clumped grass clippings are a sign of infrequent mowing, calling for an adjustment in the mowing schedule.

When mowing any area, try to alternate mowing patterns. This tends to keep grass blades more erect and assures an even cut. A dull mower will cause color loss due to tearing of the turf plant, and since mowing will ultimately determine the appearance of any turf area there is an absolute necessity for a clean sharp cut.

Weed & Pest Control and Fertilizing- In order to maintain turf grass health, vigor color, and nutrients, fertilizer must be added to the soil. Recommendations for fertilization of lawn areas are as follows; fertilize at the rate of one (1) pound of nitrogen per thousand square feet, per year is optimum. Fertilizer should be a balanced slow release, sulfur coated type fertilizer.

Weed Control - All turf areas will require some weed control, for both weed grasses and dicot weeds. Weeds should be treated at the appropriate time and with a material labeled for the target weed. Please refer to the fertilizer weed and pest schedule for timing.

Pest Control - All turf areas will require some pest control. Pests should be treated at the appropriate time with a material labeled for the target pest. Please refer to the fertilizer, weed and pest schedule for timing.

Lime - A common cause for an unhealthy lawn is acidic soil. When the pH is below the neutral range (between 6-7) vital plant nutrients become fixed in the soil and cannot be absorbed by the grass plant. Lime corrects an acid soil condition, supplies calcium for plant growth and improves air and water circulation. Limestone applied at the rate of 50 lbs. per thousand square feet will adjust the soil pH one point over a period of 6-9 months.

D. Fertilizer, Weed & Pest Control Schedule – Turf Systems

<u>Spring -</u> Fertilize one (1) pound of nitrogen per 1,000 square feet

(April) Pre-emergent weed grass control

Broadleaf weed control

<u>Late Spring</u> - Fertilize one (1) pound of nitrogen per 1,000 square feet

(June) Pre-emergent weed grass control

Broadleaf weed control Insect Control (if needed)

*Summer - Fertilize one (1) pound of nitrogen per 1,000 square feet

(August) Broadleaf weed control (if needed)

Insect Control (if needed)

<u>Fall</u> - Fertilize one (1) pound of nitrogen per 1,000 square feet

(September)

Lawn Maintenance Task Schedule

MARCH (Weather permitting)

- Clean up winter debris, sand, leaves, trash etc.
- Re-edge mulch beds, maintain at 2-3" maximum.
- Fertilize plants
- Aerate and thatch turf (conditions permitting)

APRIL

- Reseed or sod all areas needing attention.
- Fertilize and weed control
- Lime
- Start mowing when grass reaches 2-1/2", mow to 2"

MAY

- Mow turf to 2-2-1/2"
- Weed as necessary.
- Check for disease and pest problems in both turf and plants.

^{*}Omit if area is not to be irrigated

JUNE

- Mow turf to 2-1/2" 3"
- Fertilize and weed control.
- Weed
- Check for disease and pest problems in both turf and plants, treat as necessary.

PROVISIONS FOR SOLID WASTE MANAGEMENT (SITE TRASH)

Trash will be placed in on-site dumpsters and the Owner will make provisions for its regular and timely removal.

SNOW DISPOSAL AND PLOWING PLANS

The purpose of the snow and snowmelt management plan is to provide guidelines regarding snow disposal site selection, site preparation and maintenance that are acceptable to the Department of Environmental Protection. For the areas that require snow removal, snow storage onsite will largely be accomplished by using pervious areas along the shoulder of the roadway and development as windrowed by plows.

- Avoid dumping of snow into any water body, including rivers, ponds, or wetlands. In addition to water quality impacts and flooding, snow disposed of in open water can cause navigational hazards when it freezes into ice blocks.
- Avoid disposing of snow on top of storm drain catch basins or in stormwater basins. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.
- In significant storm events, the melting or off-site trucking of snow may be implemented. These activities shall be conducted in accordance with all local, state and federal regulations.

WINTER ROAD SALT AND/OR SAND USE AND STORAGE RESTRICTIONS

The applicant will be responsible for sanding and salting the site. No storage on site.

STREET SWEEPING SCHEDULES

There are three types of sweepers: Mechanical, Regenerative Air, and Vacuum Filter.

- 1) Mechanical: Mechanical sweepers use brooms or rotary brushes to scour the pavement.
- 2) Regenerative Air: These sweepers blow air onto the road or parking lot surface, causing fines to rise where they are vacuumed.
- 3) Vacuum filter: These sweepers remove fines along roads. Two general types of vacuum filter sweepers are available wet and dry. The dry type uses a broom in combination with the vacuum. The wet type uses water for dust suppression

Regardless of the type chosen, the efficiency of street sweeping is increased when sweepers are operated in tandem.

This project has not included street sweeping as part of the TSS removal calculations. However, it is recommended that street sweeping of the parking areas occur four times a year, including once after the spring snow melt.

Reuse and Disposal of Street Sweepings

Once removed from paved surfaces, the sweepings must be handled and disposed of properly. Mass DEP's Bureau of Waste Prevention has issued a written policy regarding the reuse and disposal of street sweepings. These sweepings are regulated as a solid waste, and can be used in three ways:

• In one of the ways already approved by Mass DEP (e.g., daily cover in a landfill, additive to compost, fill in a public way)

- If approved under a Beneficial Use Determination
- Disposed in a landfill

TRAINING OF STAFF OR PERSONNEL INVOLVED WITH IMPLEMENTING LONG-TERM POLLUTION PREVENTION PLAN

The Long-Term Pollution Prevention Plan is to be implemented by property owner of the site. Trained and, if required, licensed Professionals are to be hired by the owner as applicable to implement the Long-Term Pollution Prevention Plan.

LIST OF EMERGENCY CONTACTS FOR IMPLEMENTING LONG-TERM POLLUTION PREVENTION PLAN

The applicant will be required to implement the Long-Term Pollution Prevention Plan and will create and maintain a list of emergency contacts.

POST CONSTRUCTION PHASE INSPECTION SCHEDULE AND EVALUATION CHECKLIST

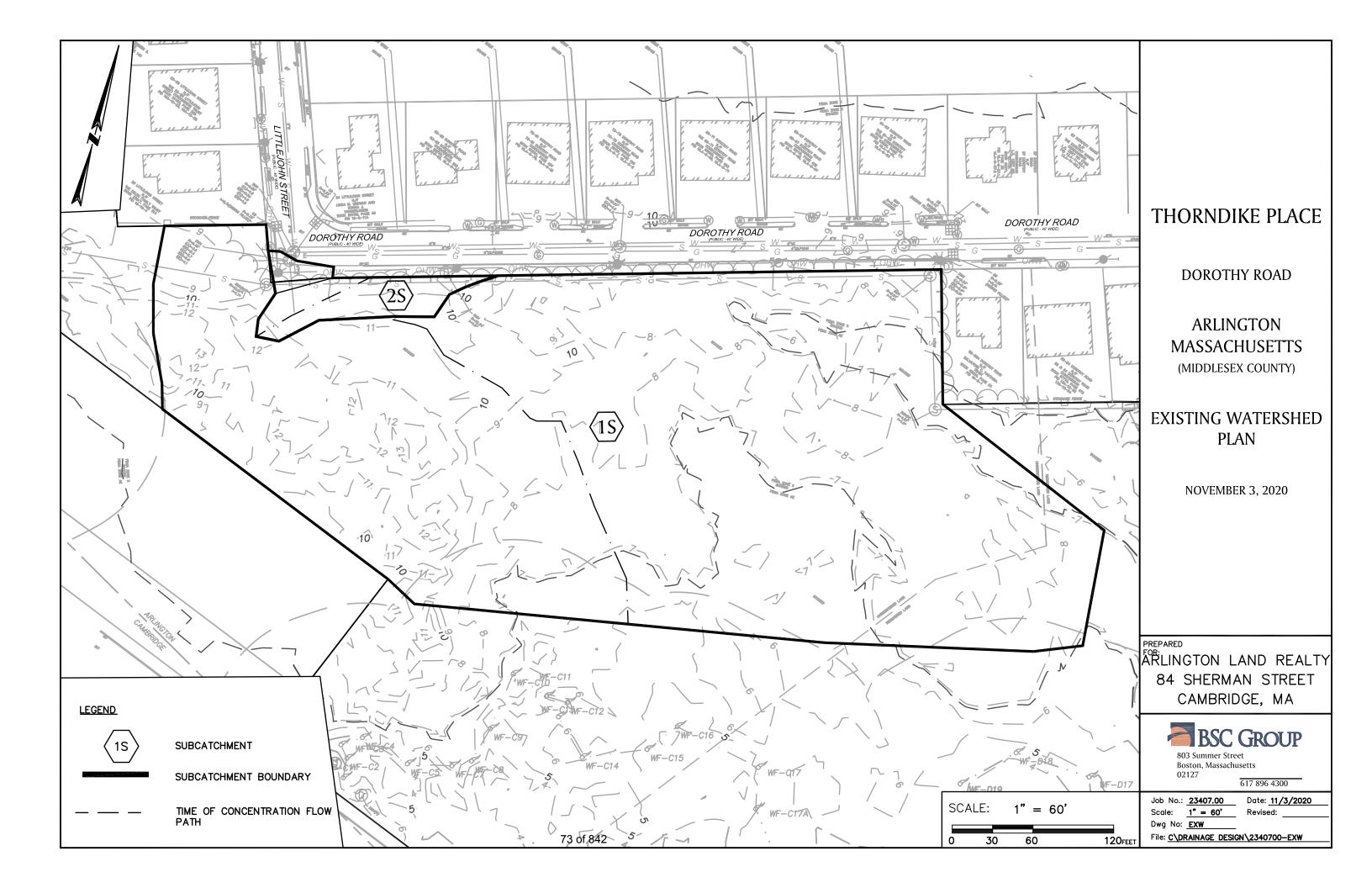
Inspection Date	Inspector	BMP Inspected	Inspection Frequency Requirement s	Comments	Recommendation	Follow-up Inspection Required (yes/no)
		Catch Basin	Four times a year			
		Water Quality Units	Four times a year			
		Infiltration System	Twice a year			
		Pipe Outlet Protection	Once a year			

- 1. Refer to the Massachusetts Stormwater Handbook Volume Two: Stormwater Technical Handbook (February 2008) for recommendations regarding frequency for inspections and maintenance of specific BMP's
- 2. Inspections to be conducted by a qualified professional such as an environmental scientist or civil engineer.
- 3. Limited or no use of sodium chloride salts, fertilizers or pesticides recommended.
- 4. Other Notes: (Include deviations from Conservation Commission Approvals, Planning Board Approvals and Approved Plans)

SECTION 5.0

HYDROLOGY CALCULATIONS

5.01 EXISTING WATERSHED PLAN



5.02 EXISTING HYDROLOGY CALCULATIONS (HYDROCAD $^{\text{TM}}$ PRINTOUTS)



Thorndike Place Pre-Development

2340700-EX

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC Printed 11/3/2020 Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.021	98	Paved parking, HSG C (2S)
3.534	70	Woods, Good, HSG C (1S, 2S)
3 555	70	TOTAL AREA

Thorndike Place Pre-Development

2340700-EX

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC Printed 11/3/2020 Page 3

Soil Listing (all nodes)

Area	Soil	Subcatchment
 (acres)	Group	Numbers
0.000	HSG A	_
0.000	HSG B	
3.555	HSG C	1S, 2S
0.000	HSG D	
0.000	Other	
3.555		TOTAL AREA

Thorndike Place Pre-Development

2340700-EX

Printed 11/3/2020 Page 4

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Ground Covers (all nodes)

_	HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
	0.000	0.000	0.021	0.000	0.000	0.021	Paved parking	2S
	0.000	0.000	3.534	0.000	0.000	3.534	Woods, Good	1S, 2S
	0.000	0.000	3.555	0.000	0.000	3.555	TOTAL AREA	

2340700-EX

Thorndike Place Pre-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 5

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Flow to Wetlands

Runoff Area=147,900 sf 0.00% Impervious Runoff Depth>0.84" Flow Length=310' Tc=17.5 min CN=70 Runoff=2.1 cfs 0.238 af

Subcatchment 2S: Flow to Street

Runoff Area=6,954 sf 13.30% Impervious Runoff Depth>1.06" Flow Length=95' Tc=6.0 min CN=74 Runoff=0.2 cfs 0.014 af

Total Runoff Area = 3.555 ac Runoff Volume = 0.252 af Average Runoff Depth = 0.85" 99.40% Pervious = 3.534 ac 0.60% Impervious = 0.021 ac 2340700-EX

Thorndike Place Pre-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Page 6

Prepared by BSC Group

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Summary for Subcatchment 1S: Flow to Wetlands

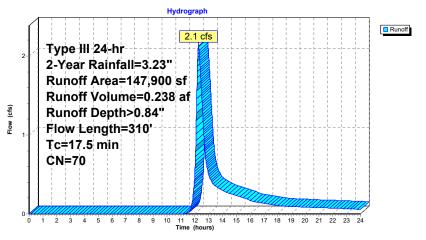
Runoff = 2.1 cfs @ 12.27 hrs, Volume= 0.238 af

0.238 af, Depth> 0.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.23"

Α	rea (sf)	CN D	escription		
1	47,900	70 V	Voods, Go	od, HSG C	
1	47,900	1	00.00% Pe	ervious Are	a
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	50	0.0240	0.07	, ,	Sheet Flow, A to B
6.1	260	0.0200	0.71		Woods: Light underbrush n= 0.400 P2= 3.23" Shallow Concentrated Flow, B to C Woodland Kv= 5.0 fps
17.5	310	Total			

Subcatchment 1S: Flow to Wetlands



Thorndike Place Pre-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Prepared by BSC Group

2340700-EX

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 7

Summary for Subcatchment 2S: Flow to Street

Runoff = 0.2 cfs @ 12.10 hrs, Volume= 0.014 af, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.23"

 Α	rea (sf)	CN E	escription		
	6,029	70 V	Voods, Go	od, HSG C	
	925	98 F	aved park	ing, HSG C	
	6,954	74 V	Veighted A	verage	
	6,029	8	6.70% Per	vious Area	
	925	1	3.30% Imp	ervious Are	ea
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
3.5	20	0.0750	0.10		Sheet Flow, A to B
					Woods: Light underbrush n= 0.400 P2= 3.23"
1.8	75	0.0200	0.71		Shallow Concentrated Flow, B to C
					Woodland Kv= 5.0 fps
5.3	95	Total, I	ncreased t	o minimum	Tc = 6.0 min

Subcatchment 2S: Flow to Street

0.21 Runoff 0.2 0.2 cfs 0.19 Type III 24-hr 0.18 0.17 2-Year Rainfall=3.23" 0.16 0.15 Runoff Area=6.954 sf 0.14 Runoff Volume=0.014 af 0.13 (S) 0.12-Runoff Depth>1.06" <u>8</u> 0.1 0.09 Flow Length=95' 0.08 Tc=6.0 min 0.07 0.06 CN=74 0.05 0.04 0.03 0.02 0.01 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 0 1 2 3 4 5 6 7 8

2340700-EX

Thorndike Place Pre-Development Type III 24-hr 10-Year Rainfall=4.90" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 8

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points Runoff by SCS TR-20 method, UH=SCS, Weighted-CN Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Flow to Wetlands

Runoff Area=147,900 sf 0.00% Impervious Runoff Depth>1.95" Flow Length=310' Tc=17.5 min CN=70 Runoff=5.4 cfs 0.553 af

Subcatchment 2S: Flow to Street

Runoff Area=6,954 sf 13.30% Impervious Runoff Depth>2.28" Flow Length=95' Tc=6.0 min CN=74 Runoff=0.4 cfs 0.030 af

Total Runoff Area = 3.555 ac Runoff Volume = 0.583 af Average Runoff Depth = 1.97" 99.40% Pervious = 3.534 ac 0.60% Impervious = 0.021 ac

Thorndike Place Pre-Development Type III 24-hr 10-Year Rainfall=4.90" Printed 11/3/2020

2340700-EX

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 9

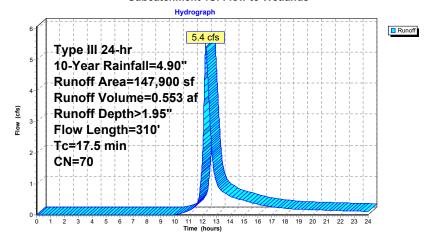
Summary for Subcatchment 1S: Flow to Wetlands

5.4 cfs @ 12.25 hrs, Volume= Runoff 0.553 af, Depth> 1.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.90"

	Α	rea (sf)	CN E	escription		
	1	47,900	70 V	Voods, Go	od, HSG C	
	1	47,900	1	00.00% Pe	ervious Are	a
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	11.4	50	0.0240	0.07		Sheet Flow, A to B Woods: Light underbrush n= 0.400 P2= 3.23"
	6.1	260	0.0200	0.71		Shallow Concentrated Flow, B to C Woodland Kv= 5.0 fps
•	17.5	310	Total			<u> </u>

Subcatchment 1S: Flow to Wetlands



2340700-EX

Thorndike Place Pre-Development Type III 24-hr 10-Year Rainfall=4.90" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 10

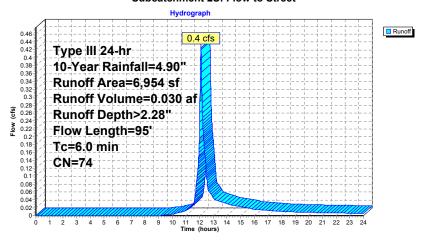
Summary for Subcatchment 2S: Flow to Street

0.4 cfs @ 12.09 hrs, Volume= Runoff 0.030 af, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.90"

_	Α	rea (sf)	CN E	Description				
		6,029	70 V	Woods, Good, HSG C				
		925	98 F	aved park	ing, HSG C			
		6,954	74 V	Weighted Average				
		6,029	8	6.70% Per	vious Area			
		925	1	3.30% Imp	ervious Are	ea		
				•				
	Tc	Length	Slope	Velocity	Capacity	Description		
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
	3.5	20	0.0750	0.10		Sheet Flow, A to B		
						Woods: Light underbrush n= 0.400 P2= 3.23"		
	1.8	75	0.0200	0.71		Shallow Concentrated Flow, B to C		
						Woodland Kv= 5.0 fps		
_	5.3	95	Total, I	ncreased t	o minimum	Tc = 6.0 min		

Subcatchment 2S: Flow to Street



2340700-EX

Thorndike Place Pre-Development Type III 24-hr 25-Year Rainfall=6.20"

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC Printed 11/3/2020 Page 11

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Flow to Wetlands

Runoff Area=147,900 sf 0.00% Impervious Runoff Depth>2.95" Flow Length=310' Tc=17.5 min CN=70 Runoff=8.3 cfs 0.836 af

Subcatchment 2S: Flow to Street

Runoff Area=6,954 sf 13.30% Impervious Runoff Depth>3.35" Flow Length=95' Tc=6.0 min CN=74 Runoff=0.6 cfs 0.045 af

Total Runoff Area = 3.555 ac Runoff Volume = 0.880 af Average Runoff Depth = 2.97" 99.40% Pervious = 3.534 ac 0.60% Impervious = 0.021 ac 2340700-EX

Thorndike Place Pre-Development Type III 24-hr 25-Year Rainfall=6.20" Printed 11/3/2020

Prepared by BSC Group

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 12

Summary for Subcatchment 1S: Flow to Wetlands

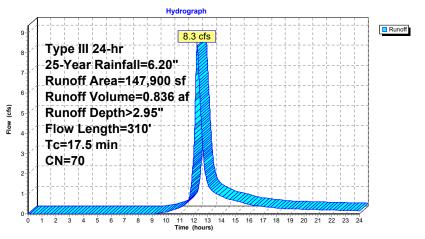
Runoff = 8.3 cfs @ 12.24 hrs, Volume=

0.836 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.20"

	Α	rea (sf)	CN D	escription		
Ξ	1	47,900	70 V	Voods, Go	od, HSG C	
	1	47,900	1	00.00% Pe	ervious Are	a
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
	11.4	50	0.0240	0.07	, ,	Sheet Flow, A to B
	6.1	260	0.0200	0.71		Woods: Light underbrush n= 0.400 P2= 3.23" Shallow Concentrated Flow, B to C Woodland Kv= 5.0 fps
	17.5	310	Total			

Subcatchment 1S: Flow to Wetlands



Thorndike Place Pre-Development Type III 24-hr 25-Year Rainfall=6.20" Printed 11/3/2020

Prepared by BSC Group

2340700-EX

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 13

Summary for Subcatchment 2S: Flow to Street

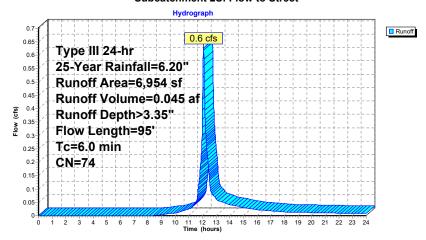
Runoff = 0.6 cfs @ 12.09 hrs, Volume= 0.045 af, Depth> 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.20"

A	rea (sf)	CN [Description		
	6,029	70 \	Voods, Go	od, HSG C	
	925	98 F	Paved park	ing, HSG C)
	6,954	74 \	Weighted A	verage	
	6,029	8	36.70% Per	vious Area	
	925	•	13.30% Imp	pervious Ar	ea
Tc	Length	Slope		Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
3.5	20	0.0750	0.10		Sheet Flow, A to B
1.8	75	0.0200	0.71		Woods: Light underbrush n= 0.400 P2= 3.23" Shallow Concentrated Flow, B to C Woodland Kv= 5.0 fps

5.3 95 Total, Increased to minimum Tc = 6.0 min

Subcatchment 2S: Flow to Street



2340700-EX

Thorndike Place Pre-Development Type III 24-hr 50-Year Rainfall=7.43"

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Printed 11/3/2020 Page 14

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points Runoff by SCS TR-20 method, UH=SCS, Weighted-CN Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Flow to Wetlands

Runoff Area=147,900 sf 0.00% Impervious Runoff Depth>3.96" Flow Length=310' Tc=17.5 min CN=70 Runoff=11.3 cfs 1.122 af

Subcatchment 2S: Flow to Street

Runoff Area=6,954 sf 13.30% Impervious Runoff Depth>4.41" Flow Length=95' Tc=6.0 min CN=74 Runoff=0.8 cfs 0.059 af

Total Runoff Area = 3.555 ac Runoff Volume = 1.180 af Average Runoff Depth = 3.98" 99.40% Pervious = 3.534 ac 0.60% Impervious = 0.021 ac

Thorndike Place Pre-Development Type III 24-hr 50-Year Rainfall=7.43" Printed 11/3/2020

2340700-EX

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 15

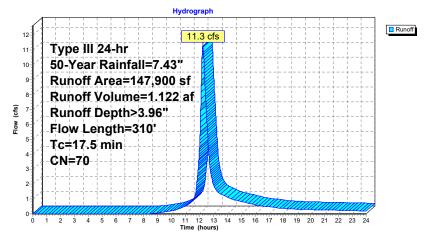
Summary for Subcatchment 1S: Flow to Wetlands

11.3 cfs @ 12.24 hrs, Volume= Runoff 1.122 af, Depth> 3.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 50-Year Rainfall=7.43"

A	rea (sf)	CN E	escription		
1	47,900	70 V	Voods, Go	od, HSG C	
1	47,900	1	00.00% Pe	ervious Are	a
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	50	0.0240	0.07	, ,	Sheet Flow, A to B
6.1	260	0.0200	0.71		Woods: Light underbrush n= 0.400 P2= 3.23" Shallow Concentrated Flow, B to C Woodland Kv= 5.0 fps
17.5	310	Total			

Subcatchment 1S: Flow to Wetlands



2340700-EX

Thorndike Place Pre-Development Type III 24-hr 50-Year Rainfall=7.43" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 16

Summary for Subcatchment 2S: Flow to Street

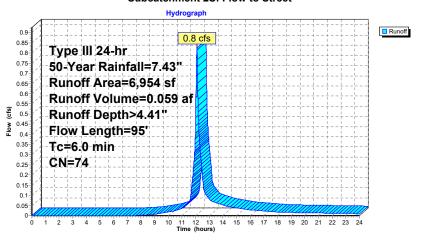
0.8 cfs @ 12.09 hrs, Volume= 0.059 af, Depth> 4.41" Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 50-Year Rainfall=7.43"

_	Α	rea (sf)	CN E	Description				
		6,029		Woods, Good, HSG C				
_		925	98 F	aved park	ing, HSG C			
		6,954	74 V	Weighted Average				
		6,029	8	6.70% Per	vious Area			
		925	1	3.30% Imp	ervious Are	ea		
	Tc	Length	Slope	Velocity	Capacity	Description		
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	·		
	3.5	20	0.0750	0.10		Sheet Flow, A to B		
						Woods: Light underbrush n= 0.400 P2= 3.23"		
	1.8	75	0.0200	0.71		Shallow Concentrated Flow, B to C		
						Woodland Kv= 5.0 fps		
-	5.3	95	Total, I	ncreased t	o minimum	Tc = 6.0 min		

95 Total, Increased to minimum Tc = 6.0 min

Subcatchment 2S: Flow to Street



2340700-EX

Thorndike Place Pre-Development Type III 24-hr 100-Year Rainfall=8.89"

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Printed 11/3/2020

Page 17

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Flow to Wetlands

Runoff Area=147,900 sf 0.00% Impervious Runoff Depth>5.22" Flow Length=310' Tc=17.5 min CN=70 Runoff=14.9 cfs 1.477 af

Subcatchment 2S: Flow to Street

Runoff Area=6,954 sf 13.30% Impervious Runoff Depth>5.72" Flow Length=95' Tc=6.0 min CN=74 Runoff=1.1 cfs 0.076 af

Total Runoff Area = 3.555 ac Runoff Volume = 1.553 af Average Runoff Depth = 5.24" 99.40% Pervious = 3.534 ac 0.60% Impervious = 0.021 ac 2340700-EX

Thorndike Place Pre-Development Type III 24-hr 100-Year Rainfall=8.89"

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC Printed 11/3/2020 Page 18

Summary for Subcatchment 1S: Flow to Wetlands

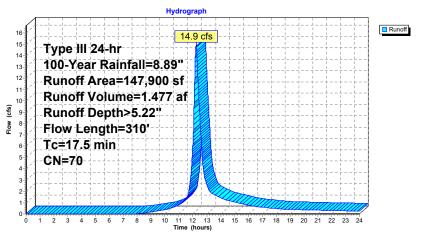
Runoff = 14.9 cfs @ 12.23 hrs, Volume=

1.477 af, Depth> 5.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.89"

A	rea (sf)	CN D	escription		
1	47,900	70 V	Voods, Go	od, HSG C	
1	47,900	1	00.00% Pe	ervious Are	a
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	50	0.0240	0.07		Sheet Flow, A to B
6.1	260	0.0200	0.71		Woods: Light underbrush n= 0.400 P2= 3.23" Shallow Concentrated Flow, B to C Woodland Kv= 5.0 fps
17.5	310	Total			

Subcatchment 1S: Flow to Wetlands



2340700-EX

Thorndike Place Pre-Development Type III 24-hr 100-Year Rainfall=8.89"

Printed 11/3/2020 Page 19

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Summary for Subcatchment 2S: Flow to Street

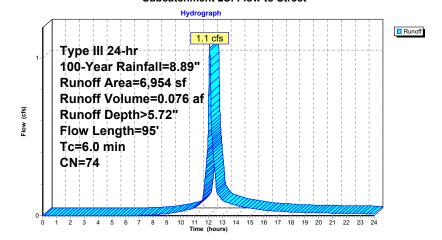
1.1 cfs @ 12.09 hrs, Volume= Runoff

0.076 af, Depth> 5.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.89"

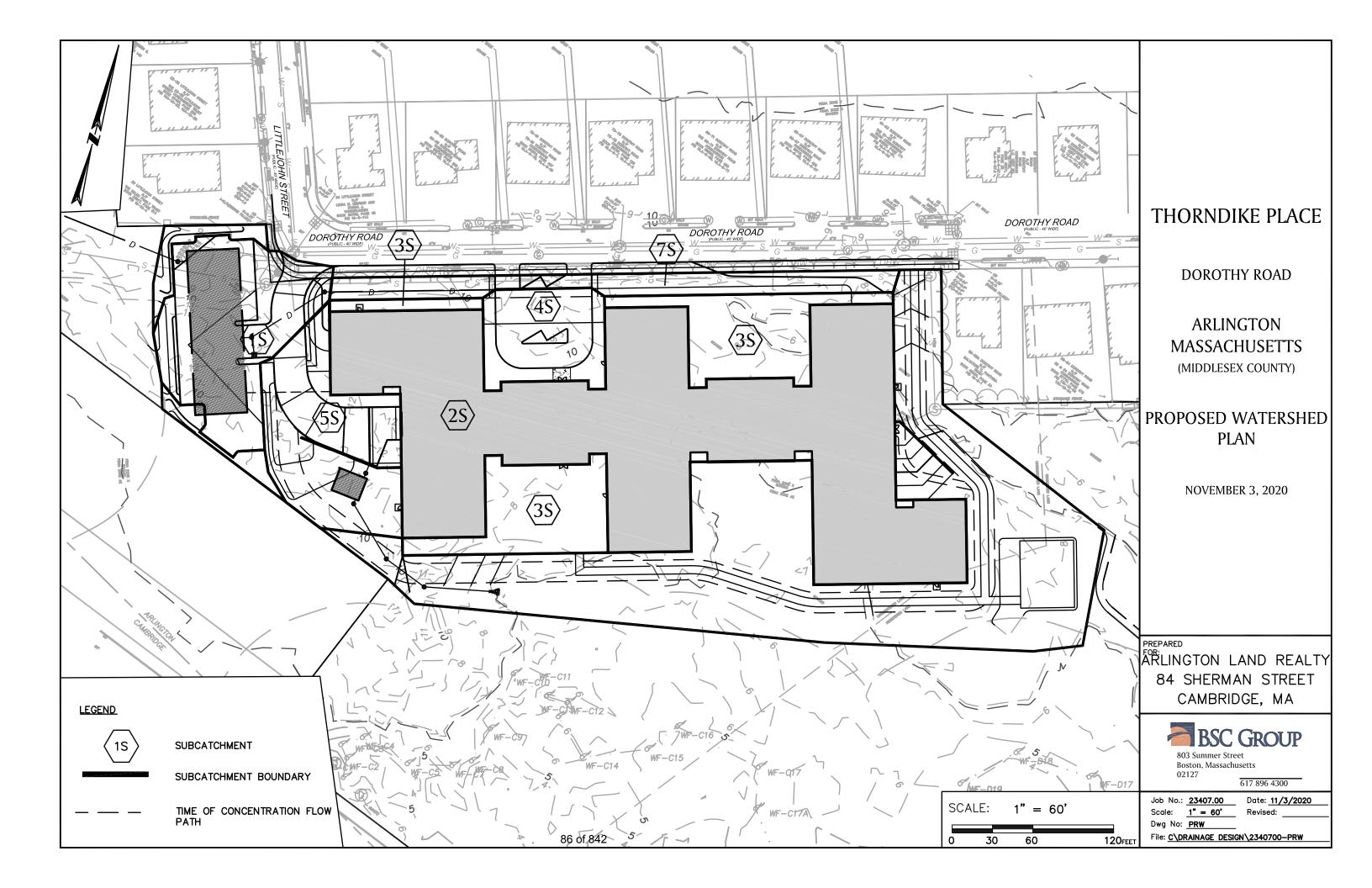
A	rea (sf)	CN E	Description		
	6,029	70 V	Voods, Go	od, HSG C	
	925	98 F	Paved park	ing, HSG C	;
	6,954	74 V	Veighted A	verage	
	6,029	8	6.70% Per	vious Area	
	925	1	3.30% Imp	pervious Are	ea
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
3.5	20	0.0750	0.10		Sheet Flow, A to B
					Woods: Light underbrush n= 0.400 P2= 3.23"
1.8	75	0.0200	0.71		Shallow Concentrated Flow, B to C
					Woodland Kv= 5.0 fps
5.3	95	Total, I	ncreased t	o minimum	Tc = 6.0 min

Subcatchment 2S: Flow to Street

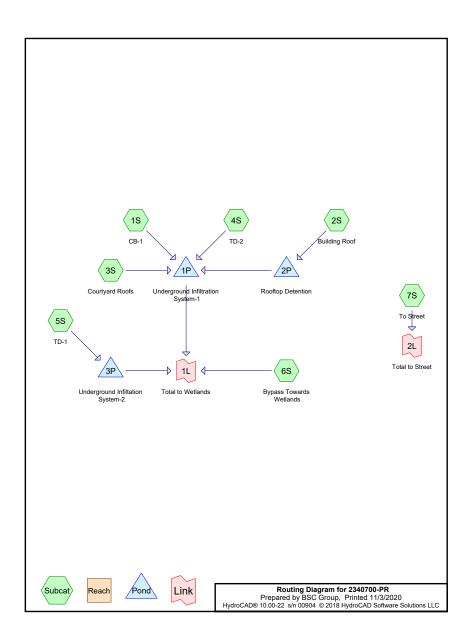


84 of 842

5.03 PROPOSED WATERSHED PLAN



5.04 PROPOSED HYDROLOGY CALCULATIONS (HYDROCAD TM PRINTOUTS)



Thorndike Place Post-Development

2340700-PR

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC Printed 11/3/2020 Page 2

Area Listing (all nodes)

	Area (acres)	CN	Description (subcatchment-numbers)
•	1.369	74	>75% Grass cover, Good, HSG C (1S, 5S, 6S, 7S)
	0.479	98	Paved parking, HSG C (1S, 4S, 5S, 7S)
	1.552	98	Roofs, HSG C (2S, 3S, 5S)
	0.155	70	Woods, Good, HSG C (6S)
	3.555	88	TOTAL AREA

Thorndike Place Post-Development

2340700-PR

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC
Page 3

Soil Listing (all nodes)

Area	Soil	Subcatchment
(acres)	Group	Numbers
0.000	HSG A	
0.000	HSG B	
3.555	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S
0.000	HSG D	
0.000	Other	
3.555		TOTAL AREA

Thorndike Place Post-Development

2340700-PR

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC Printed 11/3/2020 Page 4

Ground Covers (all nodes)

	HSG-A	HSG-B	HSG-C	HSG-D	Other	Total	Ground	Subcatchment
	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	Cover	Numbers
_	0.000	0.000	1.369	0.000	0.000	1.369	>75% Grass cover, Good	1S, 5S,
								6S, 7S
	0.000	0.000	0.479	0.000	0.000	0.479	Paved parking	1S, 4S,
								5S, 7S
	0.000	0.000	1.552	0.000	0.000	1.552	Roofs	2S, 3S,
								5S
	0.000	0.000	0.155	0.000	0.000	0.155	Woods, Good	6S
	0.000	0.000	3.555	0.000	0.000	3.555	TOTAL AREA	

Thorndike Place Post-Development
Type III 24-hr 2-Year Rainfall=3.23"
Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 5

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points Runoff by SCS TR-20 method, UH=SCS, Weighted-CN Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: CB-1	Runoff Area=13,149 sf 83.09% Impervious Runoff Depth>2.57" Tc=6.0 min CN=94 Runoff=0.9 cfs 0.065 af
Subcatchment 2S: Building Roof	Runoff Area=51,814 sf 100.00% Impervious Runoff Depth>2.99" Tc=6.0 min CN=98 Runoff=3.7 cfs 0.297 af
Subcatchment 3S: Courtyard Roofs	Runoff Area=14,820 sf 100.00% Impervious Runoff Depth>2.99" Tc=6.0 min CN=98 Runoff=1.1 cfs 0.085 af
Subcatchment 4S: TD-2	Runoff Area=6,330 sf 100.00% Impervious Runoff Depth>2.99" Tc=6.0 min CN=98 Runoff=0.5 cfs 0.036 af
Subcatchment 5S: TD-1	Runoff Area=11,872 sf 34.45% Impervious Runoff Depth>1.56" Tc=6.0 min CN=82 Runoff=0.5 cfs 0.035 af
Subcatchment 6S: Bypass Towards	Runoff Area=50,395 sf 0.00% Impervious Runoff Depth>1.00" Tc=0.0 min CN=73 Runoff=1.6 cfs 0.097 af
Subcatchment 7S: To Street	Runoff Area=6,474 sf 7.57% Impervious Runoff Depth>1.17" Tc=6.0 min CN=76 Runoff=0.2 cfs 0.015 af
Pond 1P: Underground Infiltration System Discarded=0	m-1 Peak Elev=6.51' Storage=6,223 cf Inflow=2.4 cfs 0.186 af 0.0 cfs 0.044 af Primary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.044 af
Pond 2P: Rooftop Detention	Peak Elev=57.34' Storage=12,931 cf Inflow=3.7 cfs 0.297 af und Culvert n=0.013 L=10.0' S=0.0200 '/' Outflow=0.0 cfs 0.000 af
Pond 3P: Underground Infiltation System 12.0" Rou	n-2 Peak Elev=8.40' Storage=449 cf Inflow=0.5 cfs 0.035 af and Culvert n=0.013 L=44.0' S=0.0050 '/' Outflow=0.5 cfs 0.025 af
Link 1L: Total to Wetlands	Inflow=1.6 cfs 0.122 af Primary=1.6 cfs 0.122 af
Link 2L: Total to Street	Inflow=0.2 cfs 0.015 af Primary=0.2 cfs 0.015 af

Total Runoff Area = 3.555 ac Runoff Volume = 0.629 af Average Runoff Depth = 2.12" 42.87% Pervious = 1.524 ac 57.13% Impervious = 2.031 ac

2340700-PR

Thorndike Place Post-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 6

Summary for Subcatchment 1S: CB-1

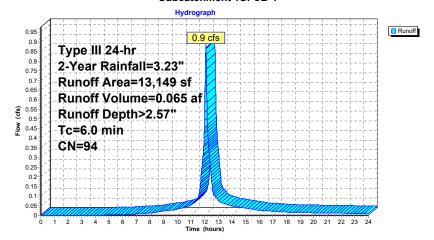
Runoff = 0.9 cfs @ 12.08 hrs, Volume= 0.065 af, Depth> 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-Year Rainfall=3.23"

_	Α	rea (sf)	CN	Description							
		10,925	98		Paved parking, HSG C						
		2,224	74	>75% Gras	s cover, Go	ood, HSG C					
		13,149	94	Weighted A	Weighted Average						
		2,224		16.91% Pe	rvious Area	a e e e e e e e e e e e e e e e e e e e					
		10,925		83.09% Im	pervious Are	rea					
	Тс	Length	Slop	,	Capacity	Description					
	(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)						
	6.0					Direct Entry, Min. Tc					

Subcatchment 1S: CB-1



Thorndike Place Post-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 7

Summary for Subcatchment 2S: Building Roof

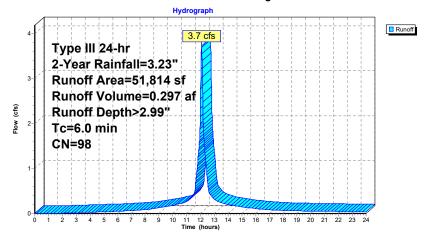
Runoff = 3.7 cfs @ 12.08 hrs, Volume=

0.297 af, Depth> 2.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.23"

A	rea (sf)	CN [Description		
	51,814	98 F	Roofs, HSC	C	
	51,814	100.00% Impervious A			Area
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min. Tc

Subcatchment 2S: Building Roof



2340700-PR

Thorndike Place Post-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 8

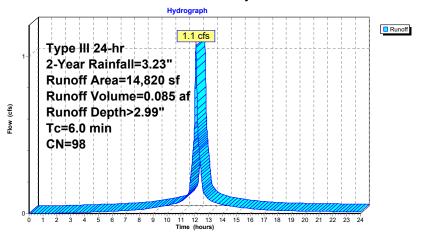
Summary for Subcatchment 3S: Courtyard Roofs

Runoff = 1.1 cfs @ 12.08 hrs, Volume= 0.085 af, Depth> 2.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.23"

A	rea (sf)	CN [Description					
	14,820	98 F	Roofs, HSG C					
	14,820	1	00.00% In	npervious A	rea			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
6.0					Direct Entry, Min. Tc			

Subcatchment 3S: Courtyard Roofs



Prepared by BSC Group

Thorndike Place Post-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 9

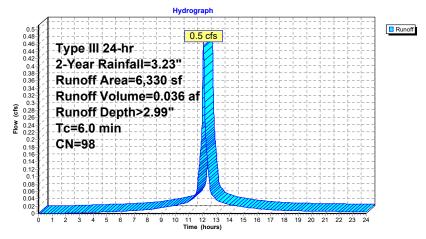
Summary for Subcatchment 4S: TD-2

0.5 cfs @ 12.08 hrs, Volume= 0.036 af, Depth> 2.99" Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.23"

	Α	rea (sf)	CN I	Description						
		6,330	98 I	Paved parking, HSG C						
		6,330		100.00% Impervious Area						
			Slope			Description				
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	6.0					Direct Entry Min To				

Subcatchment 4S: TD-2



2340700-PR

Thorndike Place Post-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 10

Summary for Subcatchment 5S: TD-1

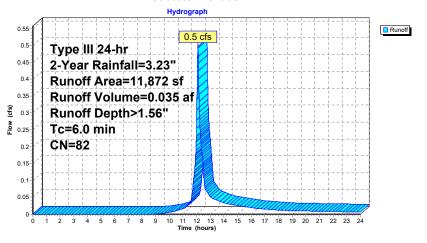
0.5 cfs @ 12.09 hrs, Volume= Runoff

0.035 af, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.23"

A	rea (sf)	CN	Description				
	980	98	Roofs, HSC	G C			
	3,110	98	Paved park	ing, HSG C			
	7,782	74	>75% Gras	s cover, Go	ood, HSG C		
	11,872	82	Weighted A	verage			
	7,782		65.55% Pei	rvious Area	l		
	4,090		34.45% lmp	pervious Ar	ea		
_							
Tc	Length	Slope	,	Capacity	Description		
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
6.0					Direct Entry, Min. Tc		

Subcatchment 5S: TD-1



Thorndike Place Post-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Prepared by BSC Group

2340700-PR

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 11

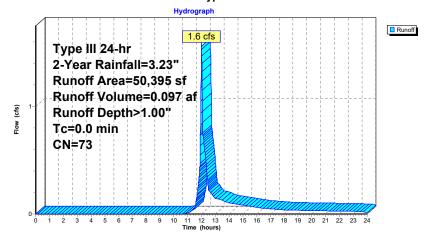
Summary for Subcatchment 6S: Bypass Towards Wetlands

Runoff = 1.6 cfs @ 12.00 hrs, Volume= 0.097 af, Depth> 1.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.23"

 Area (sf)	CN	Description			
6,751	70	Woods, Good, HSG C			
43,644	74	>75% Grass cover, Good, HSG C			
50,395	73	Weighted Average			
50 395		100 00% Pervious Area			

Subcatchment 6S: Bypass Towards Wetlands



2340700-PR

Thorndike Place Post-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 12

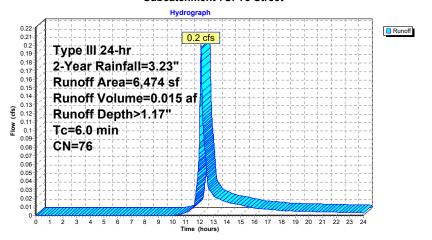
Summary for Subcatchment 7S: To Street

Runoff = 0.2 cfs @ 12.09 hrs, Volume= 0.015 af, Depth> 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.23"

	Area (sf)	CN	Description							
	490	98	Paved park	Paved parking, HSG C						
	5,984	74	>75% Gras	>75% Grass cover, Good, HSG C						
	6,474	76	Weighted A	Weighted Average						
	5,984		92.43% Per	rvious Area						
	490		7.57% Impe	ervious Area	a					
T (min	J	Slop (ft/f	,	Capacity (cfs)	Description					
6.0	0			,	Direct Entry, Min. Tc					

Subcatchment 7S: To Street



Thorndike Place Post-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

2340700-PR

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 13

Summary for Pond 1P: Underground Infiltration System-1

Inflow Area	=	1.977 ac, 97	7.42% Impervious	, Inflow Depth >	1.13" fc	or 2-Year event
Inflow	=	2.4 cfs @	12.08 hrs, Volum	ne= 0.186	3 af	
Outflow	=	0.0 cfs @	8.21 hrs, Volum	ne= 0.044	1 af, Atten	= 99%, Lag= 0.0 min
Discarded	=	0.0 cfs @	8.21 hrs, Volum	ne= 0.044	1 af	=
Primary	=	0.0 cfs @	0.00 hrs, Volum	ne= 0.000) af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 4 Peak Elev= 6.51' @ 21.34 hrs Surf.Area= 4.692 sf Storage= 6.223 cf

Plug-Flow detention time= 329.0 min calculated for 0.044 af (24% of inflow) Center-of-Mass det. time= 126.7 min (893.0 - 766.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.00'	0 cf	38.75'W x 121.08'L x 3.00'H Field A
			14,076 cf Overall - 14,076 cf Embedded = 0 cf x 40.0% Voids
#2A	5.00'	10,260 cf	StormTrap ST2 SingleTrap 2-6 x 21 Inside #1
			Inside= 101.7"W x 30.0"H => 18.82 sf x 15.40'L = 289.8 cf
			Outside= 101.7"W x 36.0"H => 25.44 sf x 15.40'L = 391.6 cf
			3 Rows of 7 Chambers
			25.44' x 107.77' Core + 6.66' Border = 38.75' x 121.08' System
#3	5.00'	141 cf	6.00'D x 5.00'H OCS-1-Impervious
		10,401 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	5.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	7.20'	15.0" Round Culvert
	•		L= 130.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 7.20' / 6.55' S= 0.0050 '/' Cc= 0.900
			n= 0.013 Flow Area= 1.23 sf

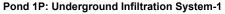
Discarded OutFlow Max=0.0 cfs @ 8.21 hrs HW=5.05' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.0 cfs)

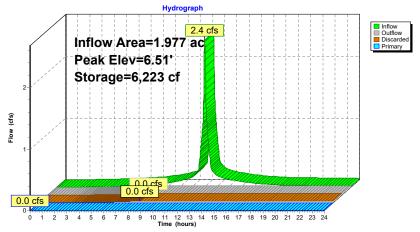
2340700-PR

Thorndike Place Post-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 14





Thorndike Place Post-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Prepared by BSC Group

Page 15

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Summary for Pond 2P: Rooftop Detention

1.189 ac,100.00% Impervious, Inflow Depth > 2.99" for 2-Year event Inflow Area =

3.7 cfs @ 12.08 hrs, Volume= 0.297 af Inflow

Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Peak Elev= 57.34' @ 24.00 hrs Surf.Area= 38,000 sf Storage= 12,931 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow) Center-of-Mass det. time= (not calculated: no outflow)

Volume #1		vert Ava	ail.Storage		escription	smatic)Listed below (Recalc)	
π ι	37	.00	30,000 C	Roonopi	Determion (Fin	sinatic)Listed below (itecale)	
Elevatio	•••	Surf.Area (sq-ft)		nc.Store bic-feet)	Cum.Store (cubic-feet)		
57.0	0			Ó	0		
58.0	0	38,000		38,000	38,000		
Device	Routing	j l	nvert Ou	tlet Devices			
#1	Primary	rimary 58.00		et / Outlet Inv	square edge h	neadwall, Ke= 0.500 7.80' S= 0.0200 '/' Cc= 0.900	

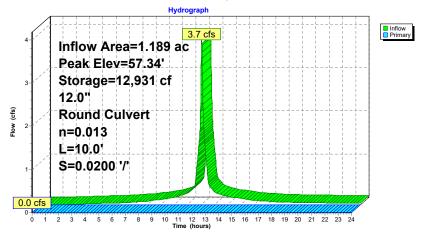
Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=57.00' (Free Discharge) 1=Roof Drain (Controls 0.0 cfs)

2340700-PR

Thorndike Place Post-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC Page 16





Thorndike Place Post-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 17

Summary for Pond 3P: Underground Infiltation System-2

0.273 ac, 34.45% Impervious, Inflow Depth > 1.56" for 2-Year event 0.5 cfs @ 12.09 hrs, Volume= 0.035 af Inflow Area =

Inflow

Outflow = 0.5 cfs @ 12.12 hrs, Volume= 0.025 af, Atten= 0%, Lag= 2.0 min

Primary = 0.5 cfs @ 12.12 hrs, Volume= 0.025 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3 Peak Elev= 8.40' @ 12.12 hrs Surf.Area= 388 sf Storage= 449 cf

Plug-Flow detention time= 150.1 min calculated for 0.025 af (71% of inflow) Center-of-Mass det. time= 54.0 min (889.0 - 835.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	3.00'	204 cf	21.50'W x 17.44'L x 1.83'H Field A
			687 cf Overall - 177 cf Embedded = 511 cf x 40.0% Voids
#2A	3.00'	177 cf	ADS_StormTech SC-310 +Cap x 12 Inside #1
			Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
			Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
			6 Rows of 2 Chambers
#3	3.00'	75 cf	4.00'D x 6.00'H OCS
		457 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	8.00'	12.0" Round Culvert
			L= 44.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 8.00' / 7.78' S= 0.0050 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.5 cfs @ 12.12 hrs HW=8.40' (Free Discharge) 1=Culvert (Barrel Controls 0.5 cfs @ 2.33 fps)

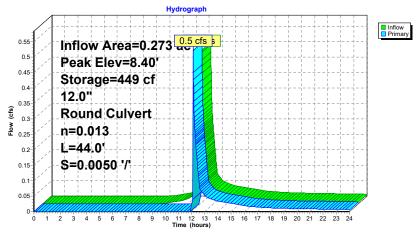
2340700-PR

Thorndike Place Post-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 18





Thorndike Place Post-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 19

Summary for Link 1L: Total to Wetlands

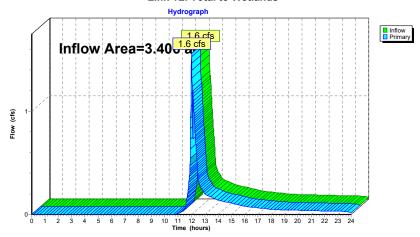
3.406 ac, 59.29% Impervious, Inflow Depth > 0.43" for 2-Year event Inflow Area =

1.6 cfs @ 12.00 hrs, Volume= 0.122 af Inflow

Primary = 1.6 cfs @ 12.00 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 1L: Total to Wetlands



2340700-PR

Thorndike Place Post-Development Type III 24-hr 2-Year Rainfall=3.23" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 20

Summary for Link 2L: Total to Street

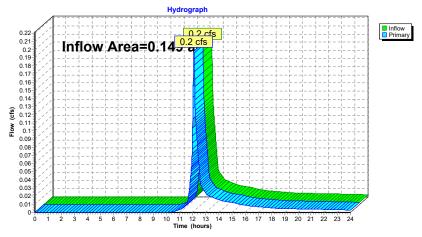
0.149 ac, 7.57% Impervious, Inflow Depth > 1.17" for 2-Year event 0.2 cfs @ 12.09 hrs, Volume= 0.015 af Inflow Area =

Inflow

Primary = 0.2 cfs @ 12.09 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 2L: Total to Street



Thorndike Place Post-Development Type III 24-hr 10-Year Rainfall=4.90"

Prepared by BSC Group Printed 11/3/2020 HvdroCAD® 10.00-22 s/n 00904 © 2018 HvdroCAD Software Solutions LLC

Page 21

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: CB-1	Runoff Area=13,149 sf	83.09%	Impervio	us Runoff Depth>4.21"
	Tc=	6.0 min	CN=94	Runoff=1.4 cfs 0.106 af

Subcatchment 2S: Building Roof	Runoff Area=51,814 sf	100.00% Impervious	Runoff Depth>4.66"
--------------------------------	-----------------------	--------------------	--------------------

Tc=6.0 min CN=98 Runoff=5.7 cfs 0.462 af

Subcatchment 3S: Courtyard Roofs Runoff Area=14.820 sf 100.00% Impervious Runoff Depth>4.66"

Tc=6.0 min CN=98 Runoff=1.6 cfs 0.132 af

Subcatchment 4S: TD-2 Runoff Area=6,330 sf 100.00% Impervious Runoff Depth>4.66"

Tc=6.0 min CN=98 Runoff=0.7 cfs 0.056 af

Subcatchment 5S: TD-1 Runoff Area=11,872 sf 34.45% Impervious Runoff Depth>2.99"

Tc=6.0 min CN=82 Runoff=1.0 cfs 0.068 af

Subcatchment 6S: Bypass Towards Runoff Area=50,395 sf 0.00% Impervious Runoff Depth>2.20"

Tc=0.0 min CN=73 Runoff=3.6 cfs 0.212 af

Subcatchment 7S: To Street Runoff Area=6,474 sf 7.57% Impervious Runoff Depth>2.45"

Tc=6.0 min CN=76 Runoff=0.4 cfs 0.030 af

Peak Elev=7.34' Storage=9,685 cf Inflow=3.7 cfs 0.294 af Pond 1P: Underground Infiltration System-1

Discarded=0.0 cfs 0.048 af Primary=0.1 cfs 0.032 af Outflow=0.1 cfs 0.080 af

Peak Elev=57.53' Storage=20,119 cf Inflow=5.7 cfs 0.462 af Pond 2P: Rooftop Detention

12.0" Round Culvert n=0.013 L=10.0' S=0.0200 '/' Outflow=0.0 cfs 0.000 af

Peak Elev=8.60' Storage=451 cf Inflow=1.0 cfs 0.068 af Pond 3P: Underground Infiltation System-2

12.0" Round Culvert n=0.013 L=44.0' S=0.0050 '/' Outflow=1.0 cfs 0.058 af

Link 1L: Total to Wetlands Inflow=4.2 cfs 0.302 af

Primary=4.2 cfs 0.302 af

Link 2L: Total to Street Inflow=0.4 cfs 0.030 af

Primary=0.4 cfs 0.030 af

Total Runoff Area = 3.555 ac Runoff Volume = 1.067 af Average Runoff Depth = 3.60" 42.87% Pervious = 1.524 ac 57.13% Impervious = 2.031 ac 2340700-PR

Thorndike Place Post-Development Type III 24-hr 10-Year Rainfall=4.90"

Prepared by BSC Group

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Printed 11/3/2020 Page 22

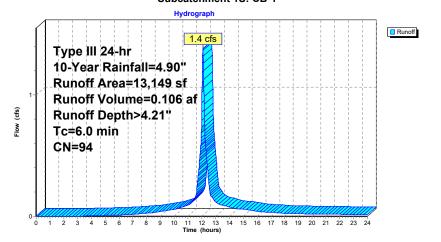
Summary for Subcatchment 1S: CB-1

Runoff 1.4 cfs @ 12.08 hrs, Volume= 0.106 af, Depth> 4.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.90"

A	rea (sf)	CN	Description					
	10,925	98	Paved park	ing, HSG C	;			
	2,224	74	>75% Gras	s cover, Go	ood, HSG C			
	13,149	94	Weighted A	verage				
	2,224		16.91% Per	vious Area				
	10,925		83.09% Imp	83.09% Impervious Area				
Tc (min)	Length (feet)	Slop (ft/f	,	Capacity (cfs)	Description			
6.0					Direct Entry, Min. Tc			

Subcatchment 1S: CB-1



Thorndike Place Post-Development
Type III 24-hr 10-Year Rainfall=4.90"
Printed 11/3/2020

Prepared by BSC Group

2340700-PR

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 23

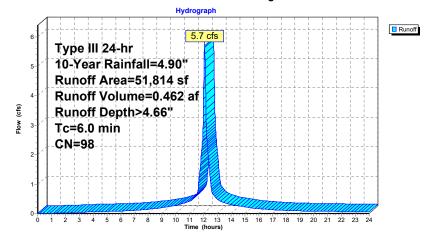
Summary for Subcatchment 2S: Building Roof

Runoff = 5.7 cfs @ 12.08 hrs, Volume= 0.462 af, Depth> 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.90"

A	rea (sf)	CN E	Description					
	51,814	98 F	Roofs, HSG C					
	51,814	1	00.00% In	pervious A	rea			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
6.0					Direct Entry, Min. Tc			

Subcatchment 2S: Building Roof



2340700-PR

Thorndike Place Post-Development
Type III 24-hr 10-Year Rainfall=4.90"
Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 24

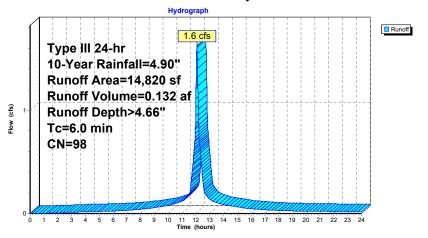
Summary for Subcatchment 3S: Courtyard Roofs

Runoff = 1.6 cfs @ 12.08 hrs, Volume= 0.132 af, Depth> 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.90"

_	Α	rea (sf)	CN	Description					
		14,820	98	Roofs, HSG C					
		14,820		100.00% In	npervious A	Area			
_	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
	6.0					Direct Entry, Min. Tc			

Subcatchment 3S: Courtyard Roofs



Thorndike Place Post-Development Type III 24-hr 10-Year Rainfall=4.90" Printed 11/3/2020

2340700-PR

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 25

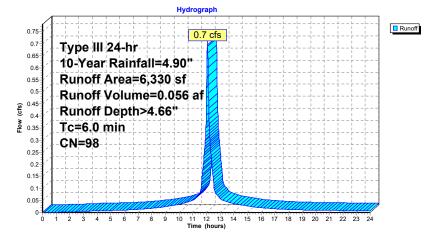
Summary for Subcatchment 4S: TD-2

Runoff = 0.7 cfs @ 12.08 hrs, Volume= 0.056 af, Depth> 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.90"

A	rea (sf)	CN E	Description					
	6,330	98 F	Paved parking, HSG C					
	6,330	1	100.00% Impervious Area					
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
6.0	-	•		-	Direct Entry, Min. Tc			

Subcatchment 4S: TD-2



2340700-PR

Thorndike Place Post-Development Type III 24-hr 10-Year Rainfall=4.90" Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 26

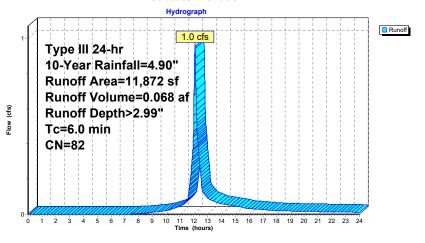
Summary for Subcatchment 5S: TD-1

Runoff = 1.0 cfs @ 12.09 hrs, Volume= 0.068 af, Depth> 2.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.90"

A	rea (sf)	CN	Description					
	980	98	Roofs, HSC	G C				
	3,110	98	Paved park	ing, HSG C				
	7,782	74	>75% Ġras	s cover, Go	ood, HSG C			
	11,872	82	Weighted A	verage				
	7,782		65.55% Pe	rvious Area	l e e e e e e e e e e e e e e e e e e e			
	4,090		34.45% Imp	pervious Ar	ea			
Tc	Length	Slope	,	Capacity	Description			
(min)	(feet)	(ft/ft	(ft/sec)	(cfs)				
6.0					Direct Entry, Min. Tc			

Subcatchment 5S: TD-1



Thorndike Place Post-Development Type III 24-hr 10-Year Rainfall=4.90"

2340700-PR

Prepared by BSC Group

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Printed 11/3/2020 Page 27

Summary for Subcatchment 6S: Bypass Towards Wetlands

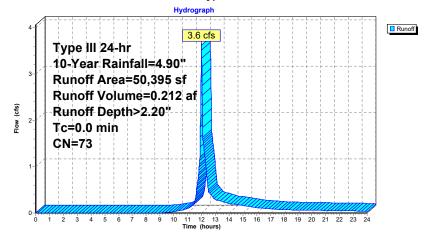
Runoff = 3.6 cfs @ 12.00 hrs, Volume=

s, Volume= 0.212 af, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.90"

Area	(sf)	CN	Description				
6,	751	70	Woods, Good, HSG C				
43,	644	74	>75% Grass cover, Good, HSG C				
	395 395	73	Weighted Average				

Subcatchment 6S: Bypass Towards Wetlands



2340700-PR

Thorndike Place Post-Development Type III 24-hr 10-Year Rainfall=4.90"

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Printed 11/3/2020 Page 28

Summary for Subcatchment 7S: To Street

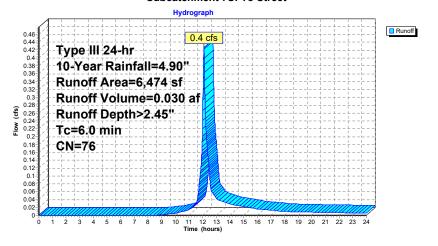
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 0.030 af,

0.030 af, Depth> 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.90"

_	Α	rea (sf)	CN	Description							
		490	98	Paved park	Paved parking, HSG C						
		5,984	74	>75% Gras	>75% Grass cover, Good, HSG C						
		6,474	76	Weighted A	Weighted Average						
		5,984		92.43% Pe	rvious Area	l .					
		490		7.57% Impervious Area							
	Тс	Length	Slop	e Velocity	Capacity	Description					
	(min)	(feet)	(ft/f	t) (ft/sec) (cfs)							
	6.0					Direct Entry, Min. Tc					

Subcatchment 7S: To Street



Thorndike Place Post-Development Type III 24-hr 10-Year Rainfall=4.90" Printed 11/3/2020

Prepared by BSC Group

2340700-PR

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 29

Summary for Pond 1P: Underground Infiltration System-1

 Inflow Area = Inflow = Inflow = Uniformal or Inflow = Inflow = Outflow = Ou

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 4 Peak Elev= 7.34' @ 16.13 hrs Surf.Area= 4,692 sf Storage= 9,685 cf

Plug-Flow detention time= 382.7 min calculated for 0.080 af (27% of inflow) Center-of-Mass det. time= 185.0 min (942.1 - 757.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.00'	0 cf	38.75'W x 121.08'L x 3.00'H Field A
			14,076 cf Overall - 14,076 cf Embedded = 0 cf x 40.0% Voids
#2A	5.00'	10,260 cf	StormTrap ST2 SingleTrap 2-6 x 21 Inside #1
			Inside= 101.7"W x 30.0"H => 18.82 sf x 15.40'L = 289.8 cf
			Outside= 101.7"W x 36.0"H => 25.44 sf x 15.40'L = 391.6 cf
			3 Rows of 7 Chambers
			25.44' x 107.77' Core + 6.66' Border = 38.75' x 121.08' System
#3	5.00'	141 cf	6.00'D x 5.00'H OCS-1-Impervious
		10,401 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	5.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	7.20'	15.0" Round Culvert
			L= 130.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 7.20' / 6.55' S= 0.0050 '/' Cc= 0.900
			n= 0.013, Flow Area= 1.23 sf

Discarded OutFlow Max=0.0 cfs @ 6.28 hrs HW=5.05' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.0 cfs)

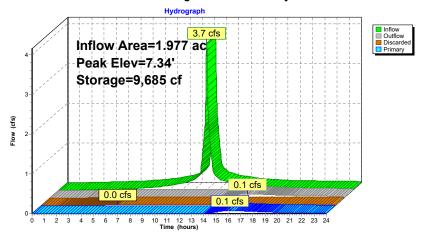
2340700-PR

Thorndike Place Post-Development
Type III 24-hr 10-Year Rainfall=4.90"
Printed 11/3/2020

Page 30

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Pond 1P: Underground Infiltration System-1



Thorndike Place Post-Development Type III 24-hr 10-Year Rainfall=4.90"

Prepared by BSC Group

Printed 11/3/2020

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 31

Summary for Pond 2P: Rooftop Detention

1.189 ac,100.00% Impervious, Inflow Depth > 4.66" for 10-Year event Inflow Area =

5.7 cfs @ 12.08 hrs, Volume= 0.462 af Inflow

0.0 cfs @ 0.00 hrs, Volume= Outflow = 0.000 af, Atten= 100%, Lag= 0.0 min

Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Peak Elev= 57.53' @ 24.00 hrs Surf.Area= 38,000 sf Storage= 20,119 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow) Center-of-Mass det. time= (not calculated: no outflow)

Volume	Inv	ert Avail.St	orage Storage	e Description		
#1	57.	00' 38,0	000 cf Roofto	O cf Rooftop Detention (Prismatic)Listed below (Re		
Elevatio		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)		
57.0 58.0	-	38,000 38,000	0 38,000	0 38,000		
Device	Routing	Invert	Outlet Device	es		
#1	Primary	58.00	L= 10.0' CF Inlet / Outlet		neadwall, Ke= 0.500 7.80' S= 0.0200 '/' Cc= 0.900	

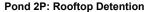
Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=57.00' (Free Discharge) 1=Roof Drain (Controls 0.0 cfs)

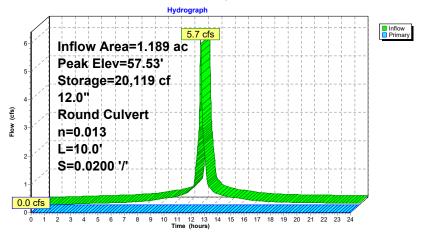
2340700-PR

Thorndike Place Post-Development Type III 24-hr 10-Year Rainfall=4.90" Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 32





Thorndike Place Post-Development Type III 24-hr 10-Year Rainfall=4.90" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

2340700-PR

Page 33

Summary for Pond 3P: Underground Infiltation System-2

0.273 ac, 34.45% Impervious, Inflow Depth > 2.99" for 10-Year event 1.0 cfs @ 12.09 hrs, Volume= 0.068 af Inflow Area =

Inflow Outflow =

1.0 cfs @ 12.09 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.1 min

Primary = 1.0 cfs @ 12.09 hrs, Volume= 0.058 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3 Peak Elev= 8.60' @ 12.09 hrs Surf.Area= 388 sf Storage= 451 cf

Plug-Flow detention time= 93.6 min calculated for 0.058 af (85% of inflow) Center-of-Mass det. time= 29.4 min (845.9 - 816.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	3.00'	204 cf	21.50'W x 17.44'L x 1.83'H Field A
			687 cf Overall - 177 cf Embedded = 511 cf x 40.0% Voids
#2A	3.00'	177 cf	ADS_StormTech SC-310 +Cap x 12 Inside #1
			Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
			Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
			6 Rows of 2 Chambers
#3	3.00'	75 cf	4.00'D x 6.00'H OCS
		457 cf	Total Available Storage

Storage Group A created with Chamber Wizard

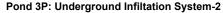
Device	Routing	Invert	Outlet Devices
#1	Primary	8.00'	12.0" Round Culvert
			L= 44.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 8.00' / 7.78' S= 0.0050 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf

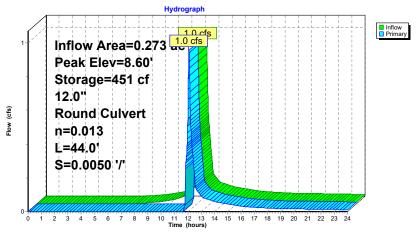
Primary OutFlow Max=1.0 cfs @ 12.09 hrs HW=8.60' (Free Discharge) 1-Culvert (Barrel Controls 1.0 cfs @ 2.80 fps)

2340700-PR

Thorndike Place Post-Development Type III 24-hr 10-Year Rainfall=4.90"

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC Printed 11/3/2020 Page 34





Thorndike Place Post-Development Type III 24-hr 10-Year Rainfall=4.90" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 35

Summary for Link 1L: Total to Wetlands

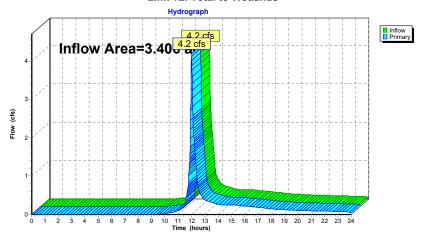
3.406 ac, 59.29% Impervious, Inflow Depth > 1.06" for 10-Year event Inflow Area =

0.302 af 4.2 cfs @ 12.00 hrs, Volume= Inflow

Primary = 4.2 cfs @ 12.00 hrs, Volume= 0.302 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 1L: Total to Wetlands



2340700-PR

Thorndike Place Post-Development Type III 24-hr 10-Year Rainfall=4.90" Printed 11/3/2020

Prepared by BSC Group

Page 36

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Summary for Link 2L: Total to Street

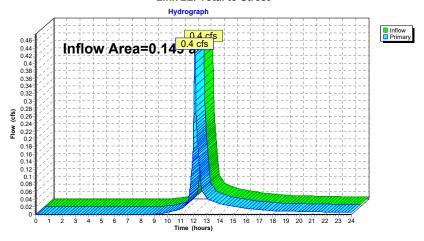
0.149 ac, $\,$ 7.57% Impervious, Inflow Depth > $\,$ 2.45" $\,$ for 10-Year event 0.4 cfs @ 12.09 hrs, Volume= $\,$ 0.030 af Inflow Area =

Inflow

Primary = 0.4 cfs @ 12.09 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 2L: Total to Street



Thorndike Place Post-Development Type III 24-hr 25-Year Rainfall=6.20"

Prepared by BSC Group
HvdroCAD® 10.00-22 s/n 00904 © 2018 HvdroCAD Software Solutions LLC

Printed 11/3/2020 Page 37

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: CB-1 Runoff Area=13,149 sf 83.09% Impervious Runoff Depth>5.49"

Tc=6.0 min CN=94 Runoff=1.8 cfs 0.138 af

Subcatchment 2S: Building Roof Runoff Area=51,814 sf 100.00% Impervious Runoff Depth>5.96"

Tc=6.0 min CN=98 Runoff=7.2 cfs 0.590 af

Subcatchment 3S: Courtyard Roofs Runoff Area=14,820 sf 100.00% Impervious Runoff Depth>5.96"

Tc=6.0 min CN=98 Runoff=2.1 cfs 0.169 af

Subcatchment 4S: TD-2 Runoff Area=6,330 sf 100.00% Impervious Runoff Depth>5.96"

Tc=6.0 min CN=98 Runoff=0.9 cfs 0.072 af

Subcatchment 5S: TD-1 Runoff Area=11,872 sf 34.45% Impervious Runoff Depth>4.17"

Tc=6.0 min CN=82 Runoff=1.3 cfs 0.095 af

Subcatchment 6S: Bypass Towards Runoff Area=50,395 sf 0.00% Impervious Runoff Depth>3.26"

Tc=0.0 min CN=73 Runoff=5.4 cfs 0.314 af

Subcatchment 7S: To Street Runoff Area=6,474 sf 7.57% Impervious Runoff Depth>3.55"

Tc=6.0 min CN=76 Runoff=0.6 cfs 0.044 af

Pond 1P: Underground Infiltration System-1 Peak Elev=7.56' Storage=10,332 cf Inflow=4.7 cfs 0.379 af

Discarded=0.0 cfs 0.050 af Primary=0.5 cfs 0.112 af Outflow=0.5 cfs 0.163 af

Pond 2P: Rooftop Detention Peak Elev=57.68' Storage=25,720 cf Inflow=7.2 cfs 0.590 af

12.0" Round Culvert n=0.013 L=10.0' S=0.0200 '/' Outflow=0.0 cfs 0.000 af

Pond 3P: Underground Infiltation System-2 Peak Elev=8.72' Storage=453 cf Inflow=1.3 cfs 0.095 af

12.0" Round Culvert n=0.013 L=44.0' S=0.0050 '/' Outflow=1.3 cfs 0.084 af

Link 1L: Total to Wetlands Inflow=6.2 cfs 0.511 af

Primary=6.2 cfs 0.511 af

Link 2L: Total to Street Inflow=0.6 cfs 0.044 af

Primary=0.6 cfs 0.044 af

Total Runoff Area = 3.555 ac Runoff Volume = 1.422 af Average Runoff Depth = 4.80" 42.87% Pervious = 1.524 ac 57.13% Impervious = 2.031 ac

2340700-PR

Thorndike Place Post-Development Type III 24-hr 25-Year Rainfall=6.20"

Prepared by BSC Group

HvdroCAD® 10.00-22 s/n 00904 © 2018 HvdroCAD Software Solutions LLC

Printed 11/3/2020 Page 38

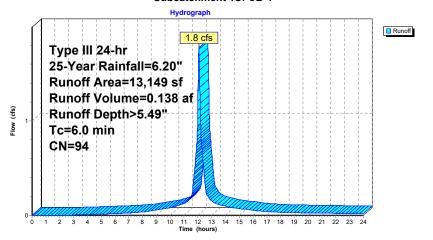
Summary for Subcatchment 1S: CB-1

Runoff = 1.8 cfs @ 12.08 hrs, Volume= 0.138 af, Depth> 5.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.20"

A	rea (sf)	CN	Description					
	10,925	98	Paved park	ing, HSG C				
	2,224	74	>75% Gras	s cover, Go	ood, HSG C			
	13,149	94	Weighted A	verage				
	2,224		16.91% Pe	rvious Area				
	10,925		83.09% Impervious Area					
Tc (min)	Length (feet)	Slope (ft/ft	,	Capacity (cfs)	Description			
6.0					Direct Entry, Min. Tc			

Subcatchment 1S: CB-1



Thorndike Place Post-Development Type III 24-hr 25-Year Rainfall=6.20" Printed 11/3/2020

2340700-PR Prepared by BSC Group

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 39

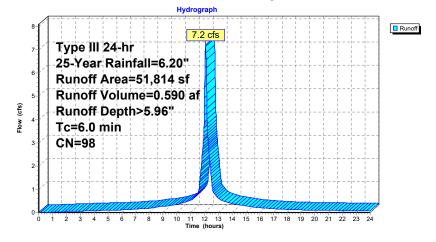
Summary for Subcatchment 2S: Building Roof

Runoff = 7.2 cfs @ 12.08 hrs, Volume= 0.590 af, Depth> 5.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.20"

Area (sf)	CN	Description					
51,814	98	Roofs, HSG C					
51,814 100.00% Impervious Ar			npervious A	vrea			
Tc Lengt (min) (feet			Capacity (cfs)	Description			
6.0			-	Direct Entry, Min. Tc			

Subcatchment 2S: Building Roof



2340700-PR

Thorndike Place Post-Development

Type III 24-hr 25-Year Rainfall=6.20"

Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 40

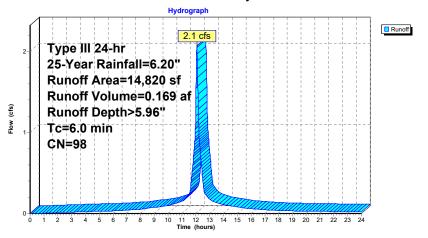
Summary for Subcatchment 3S: Courtyard Roofs

Runoff = 2.1 cfs @ 12.08 hrs, Volume= 0.169 af, Depth> 5.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.20"

A	rea (sf)	CN I	Description					
	14,820	98 F	Roofs, HSG C					
	14,820		100.00% Impervious Area					
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
6.0					Direct Entry, Min. Tc			

Subcatchment 3S: Courtyard Roofs



Thorndike Place Post-Development Type III 24-hr 25-Year Rainfall=6.20" Printed 11/3/2020

Prepared by BSC Group

2340700-PR

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 41

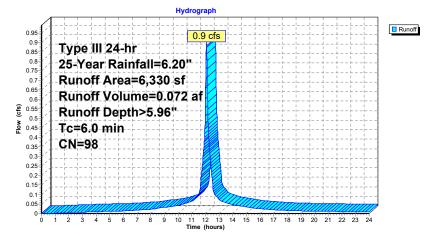
Summary for Subcatchment 4S: TD-2

Runoff = 0.9 cfs @ 12.08 hrs, Volume= 0.072 af, Depth> 5.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.20"

A	rea (sf)	CN E	Description					
	6,330	98 F	Paved parking, HSG C					
	6,330	1	100.00% Impervious Area					
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
6.0	-	•		-	Direct Entry, Min. Tc			

Subcatchment 4S: TD-2



2340700-PR

Thorndike Place Post-Development Type III 24-hr 25-Year Rainfall=6.20" Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 42

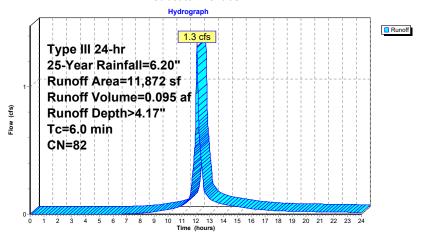
Summary for Subcatchment 5S: TD-1

Runoff = 1.3 cfs @ 12.09 hrs, Volume= 0.095 af, Depth> 4.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.20"

A	rea (sf)	CN	Description			
	980	980 98 Roofs, HSG C				
	3,110	98	Paved parking, HSG C			
	7,782	74	>75% Grass cover, Good, HSG C			
	11,872 82 Weighted Average					
	7,782 65.55% Pervious Area					
	4,090 34.45% Impervious Area					
_						
Tc	Length	Slope		Capacity	Description	
(min)	(feet)	(ft/ft	(ft/sec)	(cfs)		
6.0					Direct Entry, Min. Tc	

Subcatchment 5S: TD-1



2340700-PR

Prepared by BSC Group

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 43

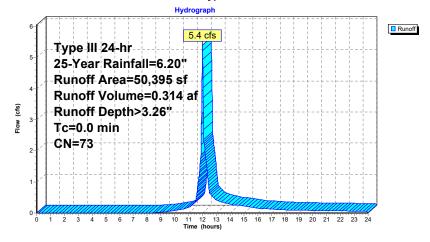
Summary for Subcatchment 6S: Bypass Towards Wetlands

Runoff = 5.4 cfs @ 12.00 hrs, Volume= 0.314 af, Depth> 3.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.20"

Area (sf)	CN	Description
6,751	70	Woods, Good, HSG C
 43,644	74	>75% Grass cover, Good, HSG C
50,395	73	Weighted Average
50 395		100 00% Pervious Area

Subcatchment 6S: Bypass Towards Wetlands



2340700-PR

Thorndike Place Post-Development
Type III 24-hr 25-Year Rainfall=6.20"
Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 44

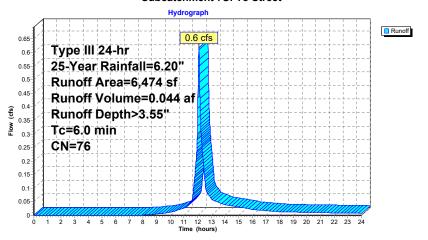
Summary for Subcatchment 7S: To Street

Runoff = 0.6 cfs @ 12.09 hrs, Volume= 0.044 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.20"

A	rea (sf)	CN	Description		
	490	98	Paved park	ing, HSG C	
	5,984	74	>75% Gras	s cover, Go	ood, HSG C
	6,474	76	Weighted A	verage	
	5,984		92.43% Per	rvious Area	
	490		7.57% Impe	ervious Are	a
Tc	Length	Slope	e Velocity	Capacity	Description
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)	
6.0					Direct Entry, Min. Tc

Subcatchment 7S: To Street



2340700-PR

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 45

Summary for Pond 1P: Underground Infiltration System-1

Inflow Area =	1.977 ac, 97.42% Impervious, Inflow De	epth > 2.30" for 25-Year event
Inflow =	4.7 cfs @ 12.08 hrs, Volume=	0.379 af
Outflow =	0.5 cfs @ 12.79 hrs, Volume=	0.163 af, Atten= 90%, Lag= 42.2 min
Discarded =	0.0 cfs @ 5.04 hrs, Volume=	0.050 af
Primary =	0.5 cfs @ 12.79 hrs, Volume=	0.112 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 4 Peak Elev= 7.56' @ 12.79 hrs Surf.Area= 4,692 sf Storage= 10,332 cf

Plug-Flow detention time= 293.3 min calculated for 0.163 af (43% of inflow) Center-of-Mass det. time= 149.9 min (902.4 - 752.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.00'	0 cf	38.75'W x 121.08'L x 3.00'H Field A
			14,076 cf Overall - 14,076 cf Embedded = 0 cf x 40.0% Voids
#2A	5.00'	10,260 cf	StormTrap ST2 SingleTrap 2-6 x 21 Inside #1
			Inside= 101.7"W x 30.0"H => 18.82 sf x 15.40'L = 289.8 cf
			Outside= 101.7"W x 36.0"H => 25.44 sf x 15.40'L = 391.6 cf
			3 Rows of 7 Chambers
			25.44' x 107.77' Core + 6.66' Border = 38.75' x 121.08' System
#3	5.00'	141 cf	6.00'D x 5.00'H OCS-1-Impervious
		10,401 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	5.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	7.20'	15.0" Round Culvert
			L= 130.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 7.20' / 6.55' S= 0.0050 '/' Cc= 0.900
			n= 0.013 Flow Δrea= 1.23 sf

Discarded OutFlow Max=0.0 cfs @ 5.04 hrs HW=5.05' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.0 cfs)

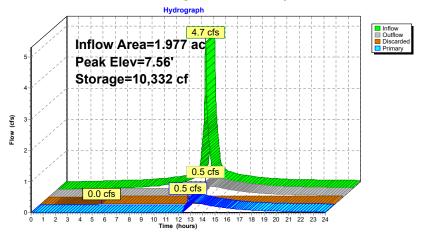
2340700-PR

Thorndike Place Post-Development Type III 24-hr 25-Year Rainfall=6.20" Printed 11/3/2020

Page 46

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Pond 1P: Underground Infiltration System-1



Thorndike Place Post-Development Type III 24-hr 25-Year Rainfall=6.20"

Prepared by BSC Group

Printed 11/3/2020

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 47

Summary for Pond 2P: Rooftop Detention

1.189 ac,100.00% Impervious, Inflow Depth > 5.96" for 25-Year event Inflow Area =

7.2 cfs @ 12.08 hrs, Volume= 0.590 af Inflow

0.0 cfs @ 0.00 hrs, Volume= Outflow = 0.000 af, Atten= 100%, Lag= 0.0 min

Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Peak Elev= 57.68' @ 24.00 hrs Surf.Area= 38,000 sf Storage= 25,720 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow) Center-of-Mass det. time= (not calculated: no outflow)

Volume	Inv	ert Avail.St	orage Storage	e Description	
#1	57.	00' 38,0	000 cf Roofto	p Detention (Pri	smatic)Listed below (Recalc)
Elevatio		Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
57.0 58.0	-	38,000 38,000	0 38,000	0 38,000	
Device	Routing	Invert	Outlet Device	es	
#1	Primary	58.00	L= 10.0' CF Inlet / Outlet		neadwall, Ke= 0.500 7.80' S= 0.0200 '/' Cc= 0.900

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=57.00' (Free Discharge) 1=Roof Drain (Controls 0.0 cfs)

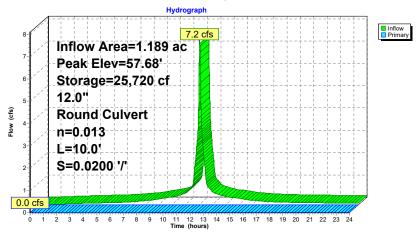
2340700-PR

Thorndike Place Post-Development Type III 24-hr 25-Year Rainfall=6.20" Printed 11/3/2020

Page 48

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC





Prepared by BSC Group

2340700-PR

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 49

Summary for Pond 3P: Underground Infiltation System-2

0.273 ac, 34.45% Impervious, Inflow Depth > 4.17" for 25-Year event 1.3 cfs @ 12.09 hrs, Volume= 0.095 af Inflow Area =

Inflow

Outflow = 1.3 cfs @ 12.09 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.1 min

Primary = 1.3 cfs @ 12.09 hrs, Volume= 0.084 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3 Peak Elev= 8.72' @ 12.09 hrs Surf.Area= 388 sf Storage= 453 cf

Plug-Flow detention time= 75.4 min calculated for 0.084 af (89% of inflow) Center-of-Mass det. time= 24.6 min (831.6 - 807.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	3.00'	204 cf	21.50'W x 17.44'L x 1.83'H Field A
			687 cf Overall - 177 cf Embedded = 511 cf x 40.0% Voids
#2A	3.00'	177 cf	ADS_StormTech SC-310 +Cap x 12 Inside #1
			Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
			Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
			6 Rows of 2 Chambers
#3	3.00'	75 cf	4.00'D x 6.00'H OCS
		457 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	8.00'	12.0" Round Culvert
	-		L= 44.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 8.00' / 7.78' S= 0.0050 '/' Cc= 0.900
			n= 0.013 Flow Δrea= 0.79 sf

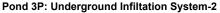
Primary OutFlow Max=1.3 cfs @ 12.09 hrs HW=8.72' (Free Discharge) 1=Culvert (Barrel Controls 1.3 cfs @ 3.04 fps)

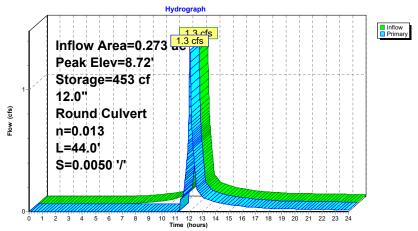
2340700-PR

Thorndike Place Post-Development Type III 24-hr 25-Year Rainfall=6.20" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 50





Thorndike Place Post-Development Type III 24-hr 25-Year Rainfall=6.20" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 51

Summary for Link 1L: Total to Wetlands

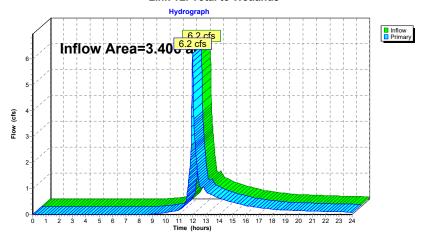
3.406 ac, 59.29% Impervious, Inflow Depth > 1.80" for 25-Year event Inflow Area =

6.2 cfs @ 12.00 hrs, Volume= 0.511 af Inflow

Primary = 6.2 cfs @ 12.00 hrs, Volume= 0.511 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 1L: Total to Wetlands



2340700-PR

Thorndike Place Post-Development Type III 24-hr 25-Year Rainfall=6.20" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 52

Summary for Link 2L: Total to Street

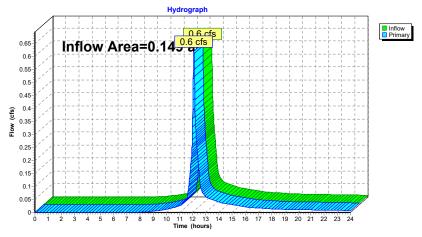
0.149 ac, $\,$ 7.57% Impervious, Inflow Depth > $\,$ 3.55" $\,$ for 25-Year event 0.6 cfs @ 12.09 hrs, Volume= $\,$ 0.044 af Inflow Area =

Inflow

Primary = 0.6 cfs @ 12.09 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 2L: Total to Street



Thorndike Place Post-Development Type III 24-hr 50-Year Rainfall=7.43"

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Printed 11/3/2020 Page 53

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: CB-1	Runoff Area=13,149 sf	83.09%	Impervio	ous Runoff Dep	oth>6.71"
	Tc=	6.0 min	CN=94	Runoff=2.2 cfs	0.169 af

Subcatchment 25: Building Root	Runon Area=51,814 St 10	0.00%	impervio	ous Runon	Depti	1>7.19
	Tc=6.0	0 min	CN=98	Runoff=8.7	cfs ().712 af

Subcatchment 3S: Courtyard Roofs	Runoff Area=14,820 sf	100.00%	Imperviou	s Runoff Depth>7.19"
_	Tax	-C 0 min	CNI-OO F	2 off-2 E ofc 0 204 of

Pond 1P: Underground Infiltration System-1 Peak Elev=8.28' Storage=10,352 cf Inflow=5.7 cfs 0.460 af Discarded=0.0 cfs 0.051 af Primary=3.1 cfs 0.190 af Outflow=3.2 cfs 0.241 af

Pond 2P: Rooftop Detention	Peak Elev=57.82' Storage=31,022 cf Inflow=8.7 cfs 0.712 af
	12.0" Round Culvert n=0.013 L=10.0' S=0.0200 '/' Outflow=0.0 cfs 0.000 af

Pond 3P: Underground Infiltation System-2 Peak Elev=8.84' Storage=454 cf Inflow=1.7 cfs 0.121 af 12.0" Round Culvert n=0.013 L=44.0' S=0.0050 '/" Outflow=1.7 cfs 0.111 af

Link 1L: Total to Wetlands	Inflow=8.2 cfs 0.716 af
	Primary=8.2 cfs 0.716 af

Total Runoff Area = 3.555 ac Runoff Volume = 1.765 af Average Runoff Depth = 5.96" 42.87% Pervious = 1.524 ac 57.13% Impervious = 2.031 ac 2340700-PR

Thorndike Place Post-Development Type III 24-hr 50-Year Rainfall=7.43" Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 54

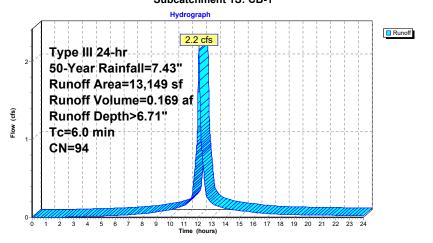
Summary for Subcatchment 1S: CB-1

Runoff = 2.2 cfs @ 12.08 hrs, Volume= 0.169 af, Depth> 6.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 50-Year Rainfall=7.43"

A	rea (sf)	CN	Description					
	10,925	98	Paved park	ing, HSG C	0			
	2,224	74	>75% Gras	s cover, Go	ood, HSG C			
·	13,149	94	Weighted A	Weighted Average				
	2,224		16.91% Per	vious Area	a			
	10,925		83.09% Imp	83.09% Impervious Area				
Tc (min)	Length (feet)	Slop (ft/f	,	Capacity (cfs)	Description			
6.0					Direct Entry, Min. Tc			

Subcatchment 1S: CB-1



Prepared by BSC Group

2340700-PR

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 55

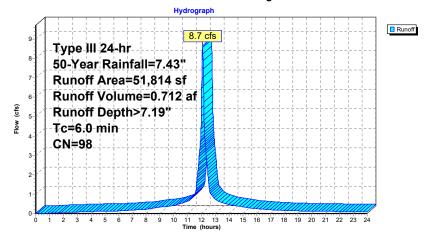
Summary for Subcatchment 2S: Building Roof

Runoff = 8.7 cfs @ 12.08 hrs, Volume= 0.712 af, Depth> 7.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 50-Year Rainfall=7.43"

Ar	rea (sf)	CN E	Description				
	51,814	98 F	8 Roofs, HSG C				
	51,814	1	00.00% In	npervious A	ırea		
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
6.0		_			Direct Entry, Min. Tc		

Subcatchment 2S: Building Roof



2340700-PR

Thorndike Place Post-Development

Type III 24-hr 50-Year Rainfall=7.43"

Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 56

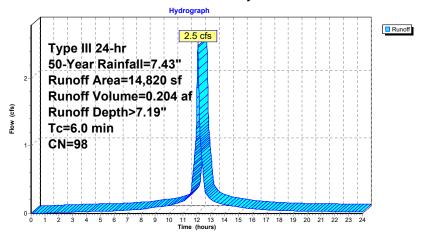
Summary for Subcatchment 3S: Courtyard Roofs

Runoff = 2.5 cfs @ 12.08 hrs, Volume= 0.204 af, Depth> 7.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 50-Year Rainfall=7.43"

Ar	ea (sf)	CN [Description		
	14,820	98 F	Roofs, HSG	C C	
	14,820	1	00.00% Im	pervious A	rea
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min. Tc

Subcatchment 3S: Courtyard Roofs



Prepared by BSC Group

2340700-PR

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 57

Summary for Subcatchment 4S: TD-2

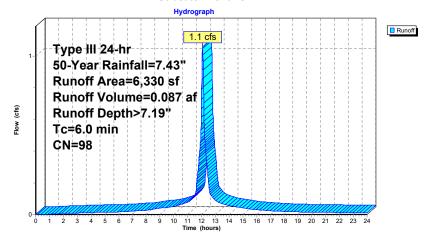
Runoff = 1.1 cfs @ 12.08 hrs, Volume= 0.08

0.087 af, Depth> 7.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 50-Year Rainfall=7.43"

A	rea (sf)	CN [N Description				
	6,330	98 F	98 Paved parking, HSG C				
	6,330	1	100.00% Impervious Area				
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
6.0					Direct Entry, Min. Tc		

Subcatchment 4S: TD-2



2340700-PR

Thorndike Place Post-Development Type III 24-hr 50-Year Rainfall=7.43" Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 58

Summary for Subcatchment 5S: TD-1

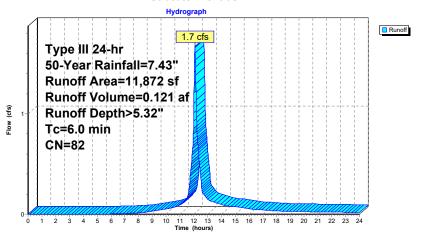
Runoff = 1.7 cfs @ 12.09 hrs, Volume= 0.1

0.121 af, Depth> 5.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 50-Year Rainfall=7.43"

n	ea (sf)	CN	Description					
	980	98	Roofs, HSG	C				
	3,110	98	Paved park	ing, HSG C	;			
	7,782	74	>75% Grass	s cover, Go	ood, HSG C			
	11,872	82	Weighted A	Weighted Average				
	7,782		65.55% Per	vious Area				
	4,090		34.45% Imp	ervious Are	ea			
	Length	Slop		Capacity	Description			
(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)				
6.0					Direct Entry, Min. Tc			

Subcatchment 5S: TD-1



Prepared by BSC Group

2340700-PR

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 59

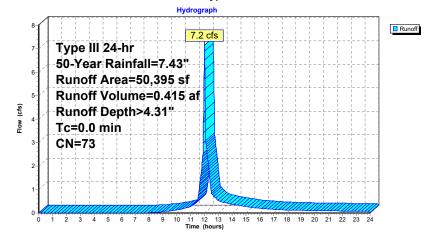
Summary for Subcatchment 6S: Bypass Towards Wetlands

Runoff = 7.2 cfs @ 12.00 hrs, Volume= 0.415 af, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 50-Year Rainfall=7.43"

 Area (sf)	CN	Description				
6,751	70	Woods, Good, HSG C				
 43,644	74	>75% Grass cover, Good, HSG C				
50,395	73	Weighted Average				
50 395		100 00% Pervious Area				

Subcatchment 6S: Bypass Towards Wetlands



Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC
Page 60

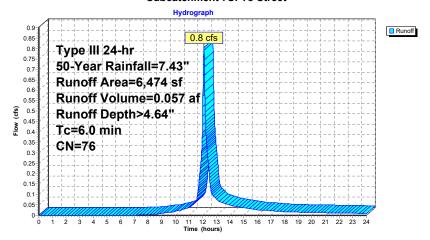
Summary for Subcatchment 7S: To Street

Runoff = 0.8 cfs @ 12.09 hrs, Volume= 0.057 af, Depth> 4.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 50-Year Rainfall=7.43"

A	rea (sf)	CN	Description				
	490	98	Paved park	ing, HSG C			
	5,984	74	>75% Gras	s cover, Go	ood, HSG C		
	6,474	76	Weighted Average				
	5,984		92.43% Per	rvious Area			
	490		7.57% Impervious Area				
Тс	Length	Slope	e Velocity	Capacity	Description		
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)			
6.0					Direct Entry, Min. Tc		

Subcatchment 7S: To Street



Prepared by BSC Group

2340700-PR

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 61

Summary for Pond 1P: Underground Infiltration System-1

 Inflow Area = Inflow Power Inflow Power Inflow Power Inflow = Inflow Power Inflow = Inflow Power Inflow

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 4 Peak Elev= 8.28' @ 12.22 hrs Surf.Area= 4,692 sf Storage= 10,352 cf

Plug-Flow detention time= 243.1 min calculated for 0.241 af (53% of inflow) Center-of-Mass det. time= $119.7 \, \text{min}$ (869.0 - 749.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.00'	0 cf	38.75'W x 121.08'L x 3.00'H Field A
			14,076 cf Overall - 14,076 cf Embedded = 0 cf x 40.0% Voids
#2A	5.00'	10,260 cf	StormTrap ST2 SingleTrap 2-6 x 21 Inside #1
			Inside= 101.7"W x 30.0"H => 18.82 sf x 15.40'L = 289.8 cf
			Outside= 101.7"W x 36.0"H => 25.44 sf x 15.40'L = 391.6 cf
			3 Rows of 7 Chambers
			25.44' x 107.77' Core + 6.66' Border = 38.75' x 121.08' System
#3	5.00'	141 cf	6.00'D x 5.00'H OCS-1-Impervious
		10,401 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	5.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	7.20'	15.0" Round Culvert
			L= 130.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 7.20' / 6.55' S= 0.0050 '/' Cc= 0.900
			n= 0.013, Flow Area= 1.23 sf

Discarded OutFlow Max=0.0 cfs @ 4.23 hrs HW=5.05' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.0 cfs)

2340700-PR

Thorndike Place Post-Development

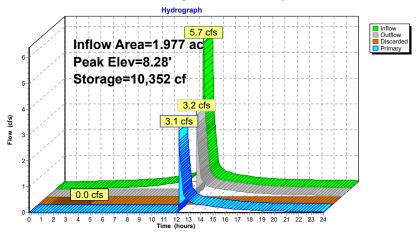
Type III 24-hr 50-Year Rainfall=7.43"

Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 62

Pond 1P: Underground Infiltration System-1



Thorndike Place Post-Development Type III 24-hr 50-Year Rainfall=7.43"

Prepared by BSC Group

Printed 11/3/2020 Page 63

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Summary for Pond 2P: Rooftop Detention

Inflow Area = 1.189 ac,100.00% Impervious, Inflow Depth > 7.19" for 50-Year event

8.7 cfs @ 12.08 hrs, Volume= 0.712 af Inflow

Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Peak Elev= 57.82' @ 24.00 hrs Surf.Area= 38,000 sf Storage= 31,022 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow) Center-of-Mass det. time= (not calculated: no outflow)

Volume	ln۱	ert Avail.St	orage	Storage D	escription		
#1	57.	57.00' 38,00		3,000 cf Rooftop Detention (Prismatic)Listed below (Reca			
Elevatio		Surf.Area (sq-ft)		:.Store c-feet)	Cum.Store (cubic-feet)		
57.0	00	38,000		0	0		
58.0	00	38,000	3	38,000	38,000		
Device	Routing	Inver	t Outl	et Devices			
#1	Primary	58.00	12.0	12.0" Round Roof Drain			
			Inlet	/ Outlet Inv		headwall, Ke= 0.500 57.80' S= 0.0200 '/' Cc= 0.900 f	

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=57.00' (Free Discharge) 1=Roof Drain (Controls 0.0 cfs)

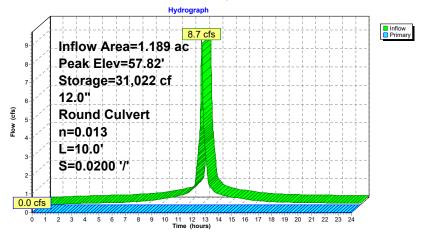
2340700-PR

Thorndike Place Post-Development Type III 24-hr 50-Year Rainfall=7.43" Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 64





Thorndike Place Post-Development Type III 24-hr 50-Year Rainfall=7.43" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 65

Summary for Pond 3P: Underground Infiltation System-2

0.273 ac, 34.45% Impervious, Inflow Depth > 5.32" for 50-Year event 1.7 cfs @ 12.09 hrs, Volume= 0.121 af Inflow Area =

Inflow

Outflow = 1.7 cfs @ 12.09 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.1 min

Primary = 1.7 cfs @ 12.09 hrs, Volume= 0.111 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3 Peak Elev= 8.84' @ 12.09 hrs Surf.Area= 388 sf Storage= 454 cf

Plug-Flow detention time= 64.4 min calculated for 0.110 af (92% of inflow) Center-of-Mass det. time= 22.0 min (822.2 - 800.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	3.00'	204 cf	21.50'W x 17.44'L x 1.83'H Field A
			687 cf Overall - 177 cf Embedded = 511 cf x 40.0% Voids
#2A	3.00'	177 cf	ADS_StormTech SC-310 +Cap x 12 Inside #1
			Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
			Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
			6 Rows of 2 Chambers
#3	3.00'	75 cf	4.00'D x 6.00'H OCS
		457 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary		12.0" Round Culvert L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 8.00' / 7.78' S= 0.0050 '/' Cc= 0.900 n= 0.013. Flow Area= 0.79 sf

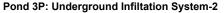
Primary OutFlow Max=1.7 cfs @ 12.09 hrs HW=8.83' (Free Discharge) 1=Culvert (Barrel Controls 1.7 cfs @ 3.22 fps)

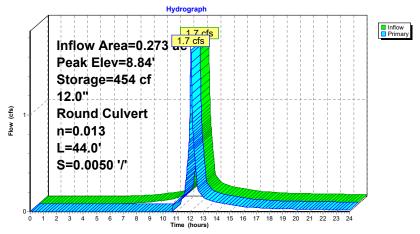
2340700-PR

Thorndike Place Post-Development Type III 24-hr 50-Year Rainfall=7.43" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 66





Thorndike Place Post-Development Type III 24-hr 50-Year Rainfall=7.43" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 67

Summary for Link 1L: Total to Wetlands

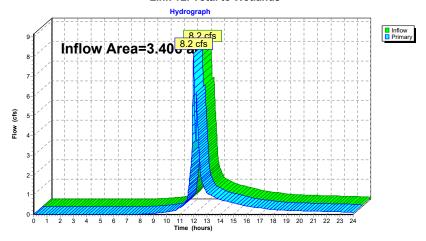
3.406 ac, 59.29% Impervious, Inflow Depth > 2.52" for 50-Year event 8.2 cfs @ 12.00 hrs, Volume= 0.716 af Inflow Area =

Inflow

Primary = 8.2 cfs @ 12.00 hrs, Volume= 0.716 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 1L: Total to Wetlands



2340700-PR

Thorndike Place Post-Development Type III 24-hr 50-Year Rainfall=7.43" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 68

Summary for Link 2L: Total to Street

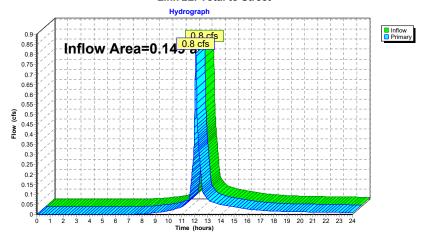
0.149 ac, $\,$ 7.57% Impervious, Inflow Depth > $\,$ 4.64" $\,$ for 50-Year event 0.8 cfs @ $\,$ 12.09 hrs, Volume= $\,$ 0.057 af Inflow Area =

Inflow

Primary = 0.8 cfs @ 12.09 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 2L: Total to Street



Thorndike Place Post-Development Type III 24-hr 100-Year Rainfall=8.89"

Prepared by BSC Group
HvdroCAD® 10.00-22 s/n 00904 © 2018 HvdroCAD Software Solutions LLC

Printed 11/3/2020 Page 69

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: CB-1 Runoff Area=13,149 sf 83.09% Impervious Runoff Depth>8.16" Tc=6.0 min CN=94 Runoff=2.6 cfs 0,205 af

Subcatchment 2S: Building Roof Runoff Area=51,814 sf 100.00% Impervious Runoff Depth>8.64"

Tc=6.0 min CN=98 Runoff=10.4 cfs 0.857 af

Subcatchment 3S: Courtyard Roofs Runoff Area=14,820 sf 100.00% Impervious Runoff Depth>8.64"
Tc=6.0 min CN=98 Runoff=3.0 cfs 0.245 af

Subcatchment 4S: TD-2 Runoff Area=6.330 sf 100.00% Impervious Runoff Depth>8.64'

Runoff Area=6,330 sf 100.00% Impervious Runoff Depth>8.64" Tc=6.0 min CN=98 Runoff=1.3 cfs 0.105 af

Subcatchment 5S: TD-1 Runoff Area=11,872 sf 34.45% Impervious Runoff Depth>6.70"

Tc=6.0 min CN=82 Runoff=2.1 cfs 0.152 af

Subcatchment 6S: Bypass Towards Runoff Area=50,395 sf 0.00% Impervious Runoff Depth>5.61"

Tc=0.0 min CN=73 Runoff=9.3 cfs 0.540 af

Subcatchment 7S: To Street Runoff Area=6,474 sf 7.57% Impervious Runoff Depth>5.97"

Tc=6.0 min CN=76 Runoff=1.0 cfs 0.074 af

Pond 1P: Underground Infiltration System-1 Peak Elev=9.88' Storage=10,398 cf Inflow=6.8 cfs 0.555 af Discarded=0.0 cfs 0.053 af Primary=6.6 cfs 0.284 af Outflow=6.6 cfs 0.336 af

Discarded-0.0 cis 0.000 at 1 filliary-0.0 cis 0.204 at Oddiow-0.0 cis 0.000 at

Pond 2P: Rooftop Detention Peak Elev=57.98' Storage=37,318 cf Inflow=10.4 cfs 0.857 af

12.0" Round Culvert n=0.013 L=10.0' S=0.0200 '/' Outflow=0.0 cfs 0.000 af

Pond 3P: Underground Infiltation System-2 Peak Elev=8.97' Storage=456 cf Inflow=2.1 cfs 0.152 af

12.0" Round Culvert n=0.013 L=44.0' S=0.0050 '/' Outflow=2.1 cfs 0.142 af

Link 1L: Total to Wetlands Inflow=12.6 cfs 0.966 af

Primary=12.6 cfs 0.966 af

Link 2L: Total to Street Inflow=1.0 cfs 0.074 af

Primary=1.0 cfs 0.074 af

Total Runoff Area = 3.555 ac Runoff Volume = 2.178 af Average Runoff Depth = 7.35" 42.87% Pervious = 1.524 ac 57.13% Impervious = 2.031 ac

2340700-PR

Thorndike Place Post-Development
Type III 24-hr 100-Year Rainfall=8.89"
Printed 11/3/2020

Prepared by BSC Group
HvdroCAD® 10.00-22 s/n 00904 © 2018 HvdroCAD Software Solutions LLC

Page 70

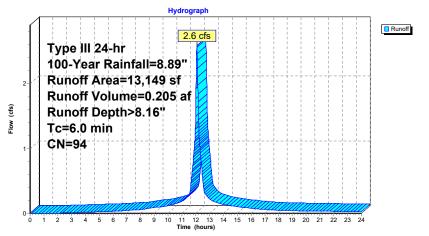
Summary for Subcatchment 1S: CB-1

Runoff = 2.6 cfs @ 12.08 hrs, Volume= 0.205 af, Depth> 8.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.89"

A	rea (sf)	CN	Description				
	10,925	98	Paved park	ing, HSG C			
	2,224	74	>75% Gras	s cover, Go	ood, HSG C		
	13,149	94	Weighted A	verage			
	2,224		16.91% Per	vious Area	l .		
	10,925		83.09% Impervious Area				
_		01			B		
Tc	Length	Slop	, - 1 , 1				
(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)			
6.0					Direct Entry, Min. Tc		

Subcatchment 1S: CB-1



2340700-PR Prepared by BSC Group Thorndike Place Post-Development Type III 24-hr 100-Year Rainfall=8.89" Printed 11/3/2020

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 71

Summary for Subcatchment 2S: Building Roof

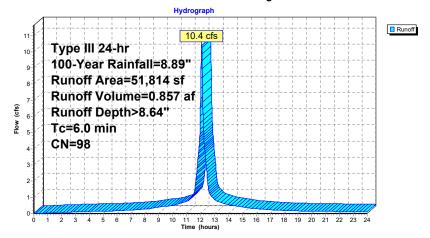
Runoff = 10.4 cfs @ 12.08 hrs, Volume=

0.857 af, Depth> 8.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.89"

A	rea (sf)	CN [Description		
	51,814	98 F	Roofs, HSC	C	
	51,814	1	100.00% Im	pervious A	Area
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min. Tc

Subcatchment 2S: Building Roof



2340700-PR

Thorndike Place Post-Development
Type III 24-hr 100-Year Rainfall=8.89"
Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 72

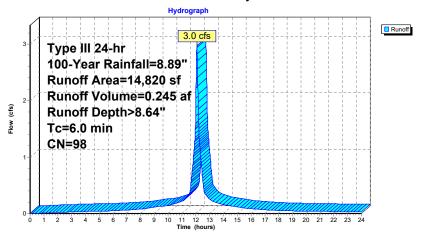
Summary for Subcatchment 3S: Courtyard Roofs

Runoff = 3.0 cfs @ 12.08 hrs, Volume= 0.245 af, Depth> 8.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.89"

Area (sf) CN	Description		
14,820	98	Roofs, HSC	G C	
14,820)	100.00% In	npervious A	vrea
Tc Leng (min) (fee		ne Velocity ft) (ft/sec)	Capacity (cfs)	Description
6.0	•			Direct Entry, Min. Tc

Subcatchment 3S: Courtyard Roofs



Prepared by BSC Group

2340700-PR

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 73

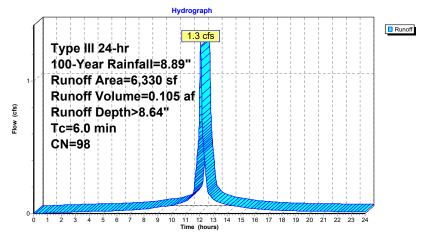
Summary for Subcatchment 4S: TD-2

Runoff = 1.3 cfs @ 12.08 hrs, Volume= 0.105 af, Depth> 8.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.89"

A	rea (sf)	CN D	escription				
	6,330	98 P	aved park	ing, HSG C			
	6,330	1	100.00% Impervious Area				
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
6.0					Direct Entry, Min. Tc		

Subcatchment 4S: TD-2



2340700-PR

Thorndike Place Post-Development
Type III 24-hr 100-Year Rainfall=8.89"
Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 74

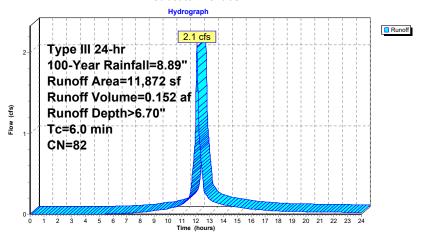
Summary for Subcatchment 5S: TD-1

Runoff = 2.1 cfs @ 12.09 hrs, Volume= 0.152 af, Depth> 6.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.89"

Area	(sf) CN	Description					
	980 98	Roofs, HSG C					
3,	110 98	Paved parking, HSG C					
7,	782 74	>75% Grass cover, Good, HSG C					
11,	872 82	Weighted Average					
7,	782	65.55% Pervious Area					
4,	090	34.45% Impervious Area					
	ngth Slo						
(min) (feet) (ft/	ft) (ft/sec) (cfs)					
6.0		Direct Entry, Min. Tc					

Subcatchment 5S: TD-1



Prepared by BSC Group

2340700-PR

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 75

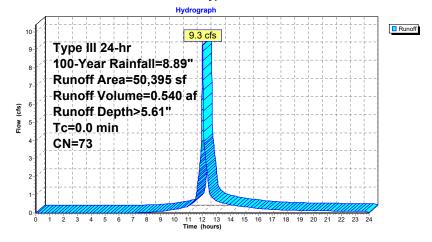
Summary for Subcatchment 6S: Bypass Towards Wetlands

Runoff = 9.3 cfs @ 12.00 hrs, Volume= 0.540 af, Depth> 5.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.89"

 Area (sf)	CN	Description
6,751	70	Woods, Good, HSG C
 43,644	74	>75% Grass cover, Good, HSG C
50,395	73	Weighted Average
50.395		100.00% Pervious Area

Subcatchment 6S: Bypass Towards Wetlands



2340700-PR

Thorndike Place Post-Development
Type III 24-hr 100-Year Rainfall=8.89"
Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 76

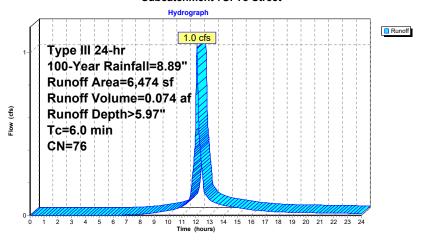
Summary for Subcatchment 7S: To Street

Runoff = 1.0 cfs @ 12.09 hrs, Volume= 0.074 af, Depth> 5.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.89"

A	rea (sf)	CN	Description		
	490	98	Paved park	ing, HSG C	
	5,984	74	>75% Gras	s cover, Go	ood, HSG C
	6,474	76	Weighted A	verage	
	5,984		92.43% Per	rvious Area	
	490		7.57% Impe	ervious Are	a
Тс	Length	Slope	e Velocity	Capacity	Description
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)	
6.0					Direct Entry, Min. Tc

Subcatchment 7S: To Street



2340700-PR

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 77

Summary for Pond 1P: Underground Infiltration System-1

Inflow Area =	1.977 ac, 97.42% Impervious, Inflow De	epth > 3.37" for 100-Year event
Inflow =	6.8 cfs @ 12.08 hrs, Volume=	0.555 af
Outflow =	6.6 cfs @ 12.10 hrs, Volume=	0.336 af, Atten= 3%, Lag= 1.0 min
Discarded =	0.0 cfs @ 3.54 hrs, Volume=	0.053 af
Primary =	6.6 cfs @ 12.10 hrs, Volume=	0.284 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 4 Peak Elev= 9.88' @ 12.10 hrs Surf.Area= 4,692 sf Storage= 10,398 cf

Plug-Flow detention time= 211.4 min calculated for 0.336 af (61% of inflow) Center-of-Mass det. time= 101.5 min (847.9 - 746.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.00'	0 cf	38.75'W x 121.08'L x 3.00'H Field A
			14,076 cf Overall - 14,076 cf Embedded = 0 cf x 40.0% Voids
#2A	5.00'	10,260 cf	StormTrap ST2 SingleTrap 2-6 x 21 Inside #1
			Inside= 101.7"W x 30.0"H => 18.82 sf x 15.40'L = 289.8 cf
			Outside= 101.7"W x 36.0"H => 25.44 sf x 15.40'L = 391.6 cf
			3 Rows of 7 Chambers
			25.44' x 107.77' Core + 6.66' Border = 38.75' x 121.08' System
#3	5.00'	141 cf	6.00'D x 5.00'H OCS-1-Impervious
		10,401 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	5.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	7.20'	15.0" Round Culvert
			L= 130.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 7.20' / 6.55' S= 0.0050 '/' Cc= 0.900
			n= 0.013, Flow Area= 1.23 sf

Discarded OutFlow Max=0.0 cfs @ 3.54 hrs HW=5.05' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=6.6 cfs @ 12.10 hrs HW=9.85' (Free Discharge) __2=Culvert (Barrel Controls 6.6 cfs @ 5.39 fps)

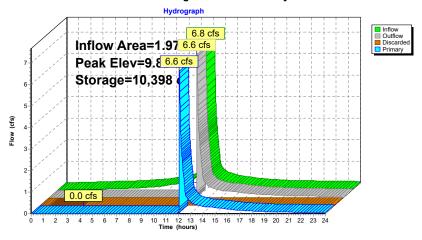
2340700-PR

Thorndike Place Post-Development Type III 24-hr 100-Year Rainfall=8.89" Printed 11/3/2020

Page 78

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Pond 1P: Underground Infiltration System-1



Thorndike Place Post-Development Type III 24-hr 100-Year Rainfall=8.89"

Prepared by BSC Group

Printed 11/3/2020

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 79

Summary for Pond 2P: Rooftop Detention

1.189 ac,100.00% Impervious, Inflow Depth > 8.64" for 100-Year event Inflow Area =

10.4 cfs @ 12.08 hrs, Volume= 0.857 af Inflow

0.0 cfs @ 0.00 hrs, Volume= Outflow 0.000 af, Atten= 100%, Lag= 0.0 min

Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs Peak Elev= 57.98' @ 24.00 hrs Surf.Area= 38,000 sf Storage= 37,318 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow) Center-of-Mass det. time= (not calculated: no outflow)

Volume		vert Avail.S		Storage D		
#1	57.	00' 38,	000 cf	Rooftop I	Detention (Pri	smatic)Listed below (Recalc)
Elevation (fee		Surf.Area (sq-ft)		.Store c-feet)	Cum.Store (cubic-feet)	
	57.00 38,000			0	0	
58.0	00	38,000	3	88,000	38,000	
Device	Routing	Inver	t Outle	et Devices		
#1	Primary	58.00		" Round F		and well Kan 0 500
			Inlet	/ Outlet Inv		neadwall, Ke= 0.500 i7.80' S= 0.0200 '/' Cc= 0.900 f

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=57.00' (Free Discharge) 1=Roof Drain (Controls 0.0 cfs)

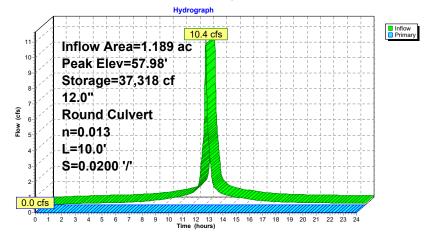
2340700-PR

Thorndike Place Post-Development Type III 24-hr 100-Year Rainfall=8.89" Printed 11/3/2020

Prepared by BSC Group
HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 80





Thorndike Place Post-Development Type III 24-hr 100-Year Rainfall=8.89" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 81

Summary for Pond 3P: Underground Infiltation System-2

0.273 ac, 34.45% Impervious, Inflow Depth > 6.70" for 100-Year event 2.1 cfs @ 12.09 hrs, Volume= 0.152 af Inflow Area =

Inflow

Outflow = 2.1 cfs @ 12.09 hrs, Volume= 0.142 af, Atten= 0%, Lag= 0.1 min

Primary = 2.1 cfs @ 12.09 hrs, Volume= 0.142 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3 Peak Elev= 8.97' @ 12.09 hrs Surf.Area= 388 sf Storage= 456 cf

Plug-Flow detention time= 55.3 min calculated for 0.142 af (93% of inflow) Center-of-Mass det. time= 19.8 min (813.5 - 793.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	3.00'	204 cf	21.50'W x 17.44'L x 1.83'H Field A
			687 cf Overall - 177 cf Embedded = 511 cf x 40.0% Voids
#2A	3.00'	177 cf	ADS_StormTech SC-310 +Cap x 12 Inside #1
			Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf
			Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap
			6 Rows of 2 Chambers
#3	3.00'	75 cf	4.00'D x 6.00'H OCS
		457 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	8.00'	12.0" Round Culvert
			L= 44.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 8.00' / 7.78' S= 0.0050 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.1 cfs @ 12.09 hrs HW=8.97' (Free Discharge) 1=Culvert (Barrel Controls 2.1 cfs @ 3.39 fps)

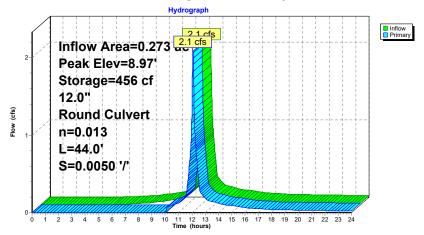
2340700-PR

Thorndike Place Post-Development Type III 24-hr 100-Year Rainfall=8.89" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 82





Thorndike Place Post-Development Type III 24-hr 100-Year Rainfall=8.89" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 83

Summary for Link 1L: Total to Wetlands

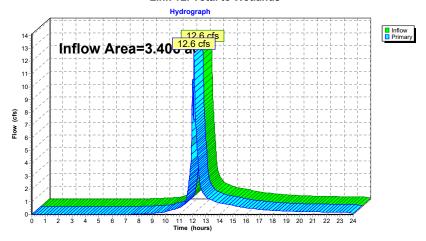
3.406 ac, 59.29% Impervious, Inflow Depth > 3.40" for 100-Year event Inflow Area =

12.6 cfs @ 12.10 hrs, Volume= 0.966 af Inflow

Primary = 12.6 cfs @ 12.10 hrs, Volume= 0.966 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 1L: Total to Wetlands



2340700-PR

Thorndike Place Post-Development Type III 24-hr 100-Year Rainfall=8.89" Printed 11/3/2020

Prepared by BSC Group HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 84

Summary for Link 2L: Total to Street

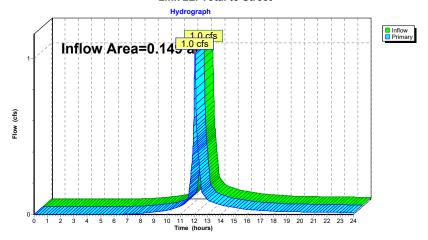
0.149 ac, $\,$ 7.57% Impervious, Inflow Depth > 5.97" $\,$ for 100-Year event 1.0 cfs @ 12.09 hrs, Volume= $\,$ 0.074 af Inflow Area =

Inflow

Primary = 1.0 cfs @ 12.09 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 2L: Total to Street



SECTION 6.0

ADDITIONAL DRAINAGE CALCULATIONS

6.01 TSS REMOVAL CALCULATIONS

TSS Removal Calculation Worksheet

Location: Thorndike Place, Arlington, MA

Project: 23407.00



Prepared By: D. Rinaldi

Date: 11/02/20

AREA 1 - CB-1

Total Impervious Area, Acres= 0.251

Α	В	С	D	Е
	TSS Removal	Starting TSS	Amount	Remaining Load
BMP	Rate	Load*	Removed (BxC)	(C-D)
Deep Sump and Hooded				
Catchbasins	0.25	1.00	0.25	0.75
Hydrodynamic Separator	0.7	0.75	0.53	0.23
Infiltration Basin	0.8	0.23	0.18	0.05

TSS Removal = 0.96

AREA 2 - TD-1

Total Impervious Area, Acres= 0.094

A	В	С	D	E
	TSS Removal	Starting TSS	Amount	Remaining Load
BMP	Rate	Load*	Removed (BxC)	(C-D)
Hydrodynamic Separator	0.7	1.00	0.70	0.30

TSS Removal = 0.70

AREA 3 - TD-2

Total Impervious Area, Acres= 0.145

А	В	C	ט	E
	TSS Removal	Starting TSS	Amount	Remaining Load
BMP	Rate	Load*	Removed (BxC)	(C-D)
Hydrodynamic Separator	0.7	1.00	0.70	0.30
Infiltration Basin	0.8	0.30	0.24	0.06

TSS Removal = 0.94

AREA 4 - Bypass to Street

Total Impervious Area, Acres = 0.011

Α	В	С	D	Е
	TSS Removal	Starting TSS	Amount	Remaining Load
BMP	Rate	Load*	Removed (BxC)	(C-D)
		1.00		

TSS Removal =

Weighted Annual Average TSS Removal Rate

[TSS Removal-1 (Area-1) + TSS Revoval-2 (Area-2) +] / [Area-1 + Area-2 + ...] = 0.88

Project Site TSS Removal = 0.88

6.02 GROUNDWATER RECHARGE VOLUME CALCULATIONS

Required Recharge Volume

 $Rv = F \times Impervious Area$

Where:

Rv = Recharge Volume

F=Target Depth Factor associated with each Hydrologic Soil Group

Impervious Area = Proposed Pavement and Rooftop area on-site

$$Rv = \left(\frac{0.25in}{12}\right)(88,469sft) =$$

Rv = 1,844 cf (required recharge volume)

As not all impervious surfaces are directed to an infiltration BMP, an adjusted Required Volume must be provided. The adjusted Required Volume (Rva) is calculated as:

$$Rva = \frac{\textit{Total Imp.Area}}{\textit{Imp.Area to BMP}} (Rv) =$$

$$Rva = \left(\frac{88,469sft}{83,889sft}\right)(1,844cf) =$$

$$Rva = 1,945 cf$$

Storage Provided

O Underground Infiltration System-1 = 9,084 cubic feet provided. Refer to the HydroCAD calculations provided for more information.

Prepared by BSC Group

HydroCAD® 10.00-22 s/n 00904 © 2018 HydroCAD Software Solutions LLC

Page 1

Summary for Pond 1P: Underground Infiltration System-1

Inflow Area =	1.977 ac, 97.42% Impervious, Inflow Deptl	n > 1.55" for Rv event
Inflow =	3.2 cfs @ 12.08 hrs, Volume= 0.	.255 af
Outflow =	0.0 cfs @ 6.92 hrs, Volume= 0.	.047 af, Atten= 99%, Lag= 0.0 min
Discarded =	0.0 cfs @ 6.92 hrs, Volume= 0.	.047 af
Primary =	0.0 cfs @ 0.00 hrs, Volume= 0.	.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 4
Peak Elev= 7.20' @ 23.95 hrs Surf.Area= 4,692 sf Storage= 9,084 cf

9,084 cu.ft. storage below outlet exceeds required recharge volume

Plug-Flow detention time= 349.3 min calculated for 0.047 af (18% of inflow) Center-of-Mass det. time= 98.5 min (858.3 - 759.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.00'	0 cf	38.75'W x 121.08'L x 3.00'H Field A
			14,076 cf Overall - 14,076 cf Embedded = 0 cf x 40.0% Voids
#2A	5.00'	10,260 cf	StormTrap ST2 SingleTrap 2-6 x 21 Inside #1
			Inside= 101.7"W x 30.0"H => 18.82 sf x 15.40'L = 289.8 cf
			Outside= 101.7"W x 36.0"H => 25.44 sf x 15.40'L = 391.6 cf
			3 Rows of 7 Chambers
			25.44' x 107.77' Core + 6.66' Border = 38.75' x 121.08' System
#3	5.00'	141 cf	6.00'D x 5.00'H OCS-1-Impervious
		10,401 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	5.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	7.20'	15.0" Round Culvert
	-		L= 130.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 7.20' / 6.55' S= 0.0050 '/' Cc= 0.900
			n= 0.013, Flow Area= 1.23 sf

Discarded OutFlow Max=0.0 cfs @ 6.92 hrs HW=5.05' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=5.00' (Free Discharge) 2=Culvert (Controls 0.0 cfs)

6.03 WATER QUALITY VOLUME CALCULATIONS

Water Quality Volume Calculation

 $V_{WQ} = (D_{WQ}/12 \text{ inches/foot}) * (A_{IMP} \text{ square feet})$

 V_{WO} = Required Water Quality Volume (in cubic feet)

 D_{WO} = Water Quality Depth: **0.5-inch**

A_{IMP} = Total Impervious Area (in acres) used for driveways, parking, etc.

Underground Infiltration Systems and Bio-Retention Areas

 $A_{IMP} = 88,469 \text{ sq.ft.}$

 $V_{WQ} = (1 \text{ inches/12 inches/foot}) * (88,469 \text{ sq.ft.})$

 $V_{\rm WQ}$ = 7,372 cubic feet (required volume), provided volume = 9,084 cubic feet (refer to the HydroCAD calculations provided in groundwater recharge section)

6.04 RIP-RAP OUTLET PROTECTION SIZING

OUTLET PROTECTION SIZING



Project No. 83669.00

Subject Outlet Protection Sizing Calcs
Location Arlington, MA

Calc By EAD
Date 11/2/2020
Checked by DRR
Date 11/3/2020

4.88 inches

FES-1

Q=Design Discharge, (ft^3/s) = 6.6 cfs
D=Culvert Diameter, (ft) = 1.25 ft
TW=Tailwater Denth (ft) = 0.5 ft (

TW=Tailwater Depth, (ft) = 0.5 ft, (0.4xD for unknow tailwater, or enter known tailwater)

(Tailwater depth is to be limited to between 0.4D and 1.0D)

Riprap Rock Sizing

 $D_{50} = 0.2D \left[\begin{array}{c} Q \\ \sqrt{gD^{2.5}} \end{array} \right] 4/3 \left[\begin{array}{c} D \\ TW \end{array} \right] \begin{array}{c} g=32.2 \text{ fps} \\ D_{50} = \text{ median rock size, ft} \end{array}$ $D_{50} = 0.28 \left[\begin{array}{c} 6.60 \\ 9.91 \end{array} \right] (4/3) \left[\begin{array}{c} 1.25 \\ 0.50 \end{array} \right] = 0.41 \text{ ft}$

Table 1 : Riprap Classes and Apron Dimensions

D50 Apron Apron

Class (in) Length Depth 5 4D 3.5D₅₀ Use Class 1 2 6 4D 3.5D50 3 10 5D 3.3D₅₀ 2.2D50 4 14 6D 2.0D50 20 7D 6 8D 2.0D50

Apron Dimensions

Length, L=5D = 6 ft
Depth=3.3D50 = 16.50 Inches

Width=3D+(2/3)L = **7.92 ft** (at apron end)

Riprap Rock Sizing Gradation

Given Size	Size of Stone, inches		
100	8	to	10
85	7	to	9
50	5	to	8
15	3	to	7

OUTLET PROTECTION SIZING



 Project No.
 83669.00

 Subject
 Outlet Protection Sizing Calcs

 Location
 Arlington, MA

Q=Design Discharge, (ft^3/s)

Date 11/3/2020

FES-2



2.1 cfs

0.19 ft 2.23 inches

Table 1: Riprap Classes and Apron Dimensions

	D50	Apron	Apron	
Class	(in)	Length	Depth	
1	5	4D	3.5D ₅₀	Use Class 1
2	6	4D	3.5D50	
3	10	5D	3.3D ₅₀	
4	14	6D	2.2D ₅₀	
5	20	7D	2.0D50	
6	22	8D	2.0D50	Ī

Apron Dimensions

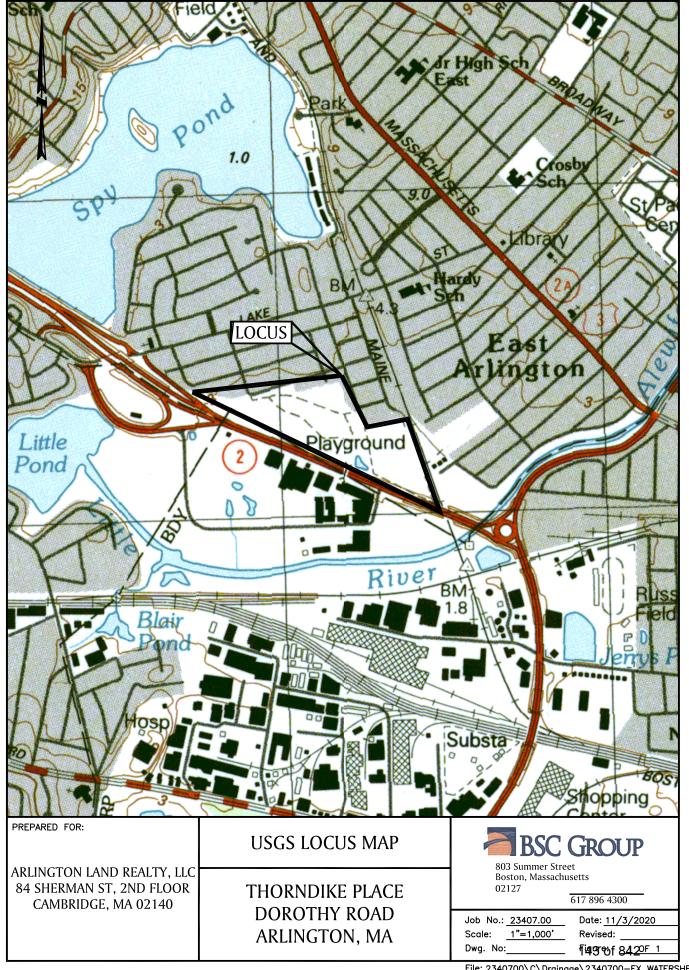
Length, L=5D 5 ft Depth=3.3D50 16.50 Inches

Width=3D+(2/3)L 6.33 ft (at apron end)

Riprap Rock Sizing Gradation			
Given Size	Size	of Stone,	inches
100	8	to	10
85	7	to	9
50	5	to	8
	_		_

APPENDIX A

USGS LOCUS MAP



APPENDIX B

FEMA MAP

National Flood Hazard Layer FIRMette

250

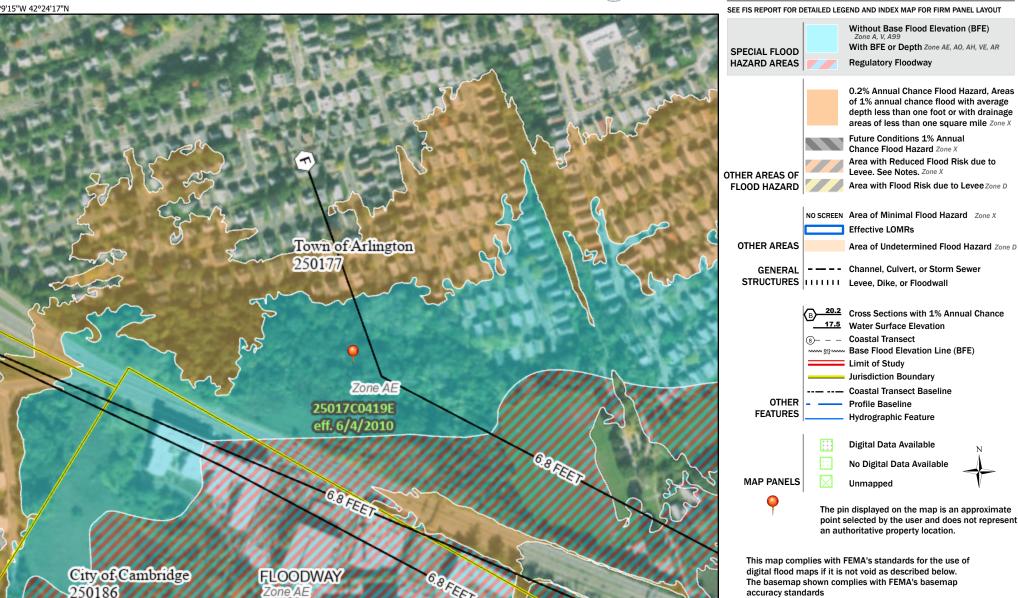
500

1,000

1.500



Legend



1:6,000

2,000

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/2/2020 at 3:34 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX C

WEB SOIL SURVEY



NRCS

Natural Resources Conservation Service A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Middlesex County, Massachusetts



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2 053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

3 149 of 842

Contents

Preface	2
How Soil Surveys Are Made	
Soil Map	
Soil Map	
Legend	
Map Unit Legend	
Map Unit Descriptions	
Middlesex County, Massachusetts	
51A—Swansea muck, 0 to 1 percent slopes	13
52A—Freetown muck, 0 to 1 percent slopes	14
603—Urban land, wet substratum	
626B—Merrimac-Urban land complex, 0 to 8 percent slopes	16
655—Udorthents, wet substratum	
References	

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

151 of 842

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

7 153 of 842

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

8 154 of 842

Custom Soil Resource Report Soil Map



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

-

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

(o)

Blowout

 \boxtimes

Borrow Pit

Ж

Clay Spot

 \wedge

Closed Depression

Š

.....

.

Gravelly Spot

0

Landfill

٨.

Lava Flow

_

Marsh or swamp

衆

Mine or Quarry

Miscellaneous Water

0

Perennial Water
Rock Outcrop

.

Saline Spot

. .

Sandy Spot

. . .

Severely Eroded Spot

.

Sinkhole

~

Slide or Slip

Ø

Sodic Spot

LEGEND

8

Spoil Area Stony Spot

Ø

Very Stony Spot

8

Wet Spot Other

Δ

Special Line Features

Water Features

_

Streams and Canals

Transportation

ransp

Rails

~

Interstate Highways

~

US Routes

 \sim

Major Roads

~

Local Roads

Background

Marie Control

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25.000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts Survey Area Data: Version 20, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50.000 or larger.

Date(s) aerial images were photographed: Sep 11, 2019—Oct 5, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI	
51A	Swansea muck, 0 to 1 percent slopes 4.3		4.6%	
52A	Freetown muck, 0 to 1 percent slopes	10.4	11.2%	
603	Urban land, wet substratum	32.1	34.5%	
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	14.3	15.4%	
655 Udorthents, wet substratum		31.9	34.3%	
Totals for Area of Interest		92.9	100.0%	

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

11

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Middlesex County, Massachusetts

51A—Swansea muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2trl2 Elevation: 0 to 1,140 feet

Mean annual precipitation: 36 to 71 inches Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Swansea and similar soils: 80 percent *Minor components:* 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Swansea

Setting

Landform: Swamps, bogs

Landform position (three-dimensional): Dip

Down-slope shape: Concave Across-slope shape: Concave

Parent material: Highly decomposed organic material over loose sandy and

gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 24 inches: muck
Oa2 - 24 to 34 inches: muck
Cg - 34 to 79 inches: coarse sand

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high

(0.14 to 14.17 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: Rare Frequency of ponding: Frequent

Available water capacity: Very high (about 16.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8w

Hydrologic Soil Group: B/D

Ecological site: F144AY043MA - Acidic Organic Wetlands

Hydric soil rating: Yes

Minor Components

Freetown

Percent of map unit: 10 percent Landform: Bogs, swamps

13 159 of 842

Landform position (three-dimensional): Dip

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

Whitman

Percent of map unit: 5 percent

Landform: Depressions, drainageways

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Base slope

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent

Landform: Drainageways, depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope, tread, dip

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

52A—Freetown muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2t2q9

Elevation: 0 to 1,110 feet

Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Freetown and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Freetown

Setting

Landform: Depressions, depressions, bogs, marshes, kettles, swamps

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave Across-slope shape: Concave

Parent material: Highly decomposed organic material

Typical profile

Oe - 0 to 2 inches: mucky peat Oa - 2 to 79 inches: muck

14 160 of 842

Properties and qualities

Slope: 0 to 1 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Very poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high

(0.14 to 14.17 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: Rare Frequency of ponding: Frequent

Available water capacity: Very high (about 19.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: B/D

Ecological site: F144AY043MA - Acidic Organic Wetlands

Hydric soil rating: Yes

Minor Components

Swansea

Percent of map unit: 5 percent

Landform: Kettles, depressions, depressions, marshes, swamps, bogs

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent

Landform: Depressions, drainageways

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope, tread, dip

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

Whitman

Percent of map unit: 5 percent

Landform: Depressions, drainageways

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Base slope

15

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

603—Urban land, wet substratum

Map Unit Setting

National map unit symbol: 9951

Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 110 to 200 days

Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope Landform position (three-dimensional): Base slope

Down-slope shape: Linear Across-slope shape: Linear

Parent material: Excavated and filled land over alluvium and/or marine deposits

Minor Components

Udorthents, loamy

Percent of map unit: 10 percent

Hydric soil rating: No

Rock outcrop

Percent of map unit: 5 percent

Landform: Ledges

Landform position (two-dimensional): Summit Landform position (three-dimensional): Head slope

Down-slope shape: Concave Across-slope shape: Concave

626B—Merrimac-Urban land complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyr9

Elevation: 0 to 820 feet

Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 250 days

Farmland classification: Not prime farmland

Map Unit Composition

Merrimac and similar soils: 45 percent

Urban land: 40 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Eskers, moraines, outwash terraces, outwash plains, kames Landform position (two-dimensional): Backslope, footslope, summit, shoulder

Landform position (three-dimensional): Side slope, crest, riser, tread

Down-slope shape: Convex Across-slope shape: Convex

Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite,

schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam Bw1 - 10 to 22 inches: fine sandy loam

Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand 2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: More than 80 inches Drainage class: Somewhat excessively drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very

high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of ponding: None

Calcium carbonate, maximum content: 2 percent Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)

Sodium adsorption ratio, maximum: 1.0

Available water capacity: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: 0 inches to manufactured layer

17

163 of 842

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00

in/hr)

Available water capacity: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydrologic Soil Group: D Hydric soil rating: Unranked

Minor Components

Windsor

Percent of map unit: 5 percent

Landform: Dunes, outwash terraces, deltas, outwash plains

Landform position (three-dimensional): Tread, riser

Down-slope shape: Convex, linear Across-slope shape: Convex, linear

Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent

Landform: Outwash plains, terraces, deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip

Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent

Landform: Eskers, kames, deltas, outwash plains

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Nose slope, side slope, crest, head slope,

rise

Down-slope shape: Convex Across-slope shape: Convex, linear

Hydric soil rating: No

655—Udorthents, wet substratum

Map Unit Setting

National map unit symbol: vr1n Elevation: 0 to 3.000 feet

Mean annual precipitation: 32 to 54 inches
Mean annual air temperature: 43 to 54 degrees F

Frost-free period: 110 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, wet substratum, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Wet Substratum

Setting

Parent material: Loamy alluvium and/or sandy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy marine deposits and/or loamy basal till and/or loamy lodgment till

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: More than 80 inches Depth to water table: More than 80 inches

Frequency of flooding: None Frequency of ponding: None

Minor Components

Urban land

Percent of map unit: 8 percent

Landform position (two-dimensional): Footslope Landform position (three-dimensional): Base slope

Down-slope shape: Linear Across-slope shape: Linear

Freetown

Percent of map unit: 4 percent Landform: Depressions, bogs

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Dip

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

Swansea

Percent of map unit: 3 percent Landform: Bogs, depressions

Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Dip

19

Down-slope shape: Concave Across-slope shape: Concave

Hydric soil rating: Yes

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2 054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2 053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2 053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2 053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

20

166 of 842

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

21 167 of 842

Wildlife Habitat and Vegetation Evaluation

Thorndike Place Dorothy Road Arlington, MA

November 2020



Prepared for: Arlington Land Realty, LLC

Matt Burne, PWS Senior Ecologist BSC Project No. 23407.00

TABLE OF CONTENTS

1.0	INTRODUCTION					
2.0	METHODS					
2.1		DP REVIEW AND FIELD PREPARATION				
2.2	FIELD S	SURVEY	2			
3.0	RESULTS					
3.1	OVERV	IEW	2			
3.2		OP REVIEW AND FIELD PREPARATION				
	3.2.1	Historical Site Context	3			
	3.2.2	Wetlands	4			
3.3	FIELD S	SURVEY				
	3.3.1	AURA Survey Locations	4			
	3.3.2	Floodplain Survey Locations	6			
	3.3.3	Possible Compensatory Storage Locations	6			
	3.3.4	Isolated Area	7			
	3.3.5	Wildlife Observations				
4.0	SUMM	ARY OF FINDINGS	7			
	4.1.1	Site Context	7			
	4.1.2	Important Wildlife Habitat Features				
	4.1.3	Invasive Species				
	4.1.4	Human Encampment				
5.0	CONCLUSION					

LIST OF ATTACHMENTS

Attachment A: Survey Site Locations

Attachment B: Thorndike Place Wildlife Habitat and Vegetation Analysis Images

Attachment C: Field Data Collection Forms



1.0 INTRODUCTION

The Thorndike Place Comprehensive Permit Civil/Site peer review conducted by BETA, dated August 5, 2020, identifies several concerns pertaining to wildlife habitat and vegetation on the project site, making several recommendations for thorough wildlife habitat and vegetation evaluation.

Recommendations include providing a field evaluation of functions and values of the Isolated Vegetated Wetland (IVW) and Arlington Bylaw Adjacent Upland Resource Areas (AURAs) to determine the area's significance to interests identified in the [Arlington] Bylaw and to conduct a wildlife habitat evaluation of the 17.7-acre site focusing on resource areas and potential loss of habitat within isolated wetlands and AURA zones.

The Arlington Regulations for Wetlands Protection (June 4, 2015) define wildlife as any non-domesticated mammal, bird, reptile, amphibian, fish, mollusk, arthropod or other invertebrate [that is not a pest], and wildlife habitat as an area being used by or necessary to provide breeding or nesting habitat, shelter, food and water for any animal species.

The Massachusetts Wetlands Protection Act (WPA) defines wildlife somewhat more restrictively as all mammals, birds, reptiles and amphibians, and additionally any state-listed species (which includes invertebrates). The WPA regulations identify the important wildlife habitat functions that wetlands provide as food, shelter, migratory or overwintering areas, or breeding areas for wildlife. The regulations further recognize that it is the topography, soil structure, plant community composition and structure, and hydrologic regime that provide important wildlife habitat functions.

This report presents the findings and analysis of a field investigation of the wildlife habitat and vegetation of the Thorndike Place project site conducted on October 27, 2020 by BSC Senior Ecologist Matt Burne, PWS. Matt holds a Master of Science degree from the University of Massachusetts Amherst in Fisheries & Wildlife Conservation and was previously employed by the Massachusetts Natural Heritage & Endangered Species Program as a Vernal Pool Ecologist and Rare Species Environmental Review Biologist for almost ten years.

2.0 METHODS

2.1 DESKTOP REVIEW AND FIELD PREPARATION

Prior to conducting field data collection, a desktop assessment of the site was conducted to identify existing known resources of potential interest including:

- Rare species habitat, Massachusetts Natural Heritage an Endangered Species Program (NHESP)
- BioMap2 Core Habitat, NHESP
- Critical Natural Communities, NHESP
- Prime Agricultural Soils, Natural Resources Conservation Service
- Current and historic aerial photography, Google Earth
- Wetlands, as mapped by BSC Group
- Flood zones, Federal Emergency Management Agency (FEMA)
- Areas of Critical Environmental Concern (ACEC), Department of Conservation and Recreation
- Important Bird Areas (IBA), National Audubon Society



Field survey points were identified in advance of field work with attention to the proposed project footprint where impacts to AURA are proposed or are immediately adjacent, to flood plain areas within the proposed project footprint, and to potentially suitable locations for compensatory storage (Attachment A).

2.2 FIELD SURVEY

A site visit was conducted on October 27, 2020 to collect data on the vegetation characteristics and important wildlife habitat features of the project site. At each field-located survey point, a 25-foot radius plot was established and vegetation was characterized within the survey plot (field forms attached as Attachment C). Field Forms developed by the Massachusetts Natural Heritage & Endangered Species Program for Quantitative Community Characterization were used to collect standardized data within each survey plot.

In addition to vegetative characterization, each survey plot was searched for signs of wildlife and for any additional features that provide important wildlife habitat values.

Survey plot center points were recorded using the ArcGIS Field Data Collector application, with GPS accuracy of approximately 15 feet under the forest cover. Photographs were collected at each survey point to create a visual record of conditions.

3.0 **RESULTS**

3.1 OVERVIEW

Much of the site is characterized by a diverse, mature forest canopy with dense understory vegetation. There are many very large specimens of Silver Maple (*Acer saccharinum*) and Cottonwood (*Populus deltoides*) throughout the property, especially near the series C wetland and on the eastern portion of the project site, near Parker Street. Several invasive exotic plant species are found throughout the site, with Garlic Mustard (*Alliaria petiolata*) especially common in the understory.

In many ways, the site is generally typical of urban forest fragments. In total, the forested area of the subject site and surrounding parcels that remain under forest canopy is approximately 18.5 acres. The setting of the forest patch that remains on this site is urban, though there is a tenable green-way connection to the bike path that leads north to Spy Pond, a Natural Heritage & Endangered Species Program BioMap2 Core Habitat and Priority Habitat polygon (PH 1421) and to the Alewife Brook Reservation, which connects to the Mystic River to the north. These connections have tree cover and are generally considered green space, though there is a heavy human presence in both corridors, and they are notably narrow.

This forest fragment is therefore not entirely isolated, despite the dense development surrounding it and the presence of the Route 2 corridor to its south, which isolates it from open space connected to Little Pond and Alewife Brook to the south. There is no direct connection to the Important Bird Area at Fresh Pond to the south in Cambridge.

Evidence was detected of several common bird species and a small number of mammals typical of urban woodland patches. There were no amphibians or reptiles encountered during the site visit, but it is recognized that late October is late in the year for encountering these groups of organisms.



It is important to acknowledge the extensive encampment of homeless persons on the subject parcel, as this has a direct and significant impact on the wildlife habitat values of the property overall. In general, wildlife species will not cohabitate with humans, and the presence of the large encampment and extensive areas of trash and waste spread throughout site depress any wildlife habitat values that may exist in this fragmented and isolated forest patch.

3.2 DESKTOP REVIEW AND FIELD PREPARATION

The status of the resources that are mapped or described by the reference material reviewed for the desktop assessment are summarized below in Table 1.

Table 1: Results of Desktop Resource Review

Resource	Source*	Present/Type	Comments
Rare Species Habitat	NHESP	Not present	Project site is not within mapped Priority Habitat or Estimated Habitat for rare species, as mapped in the current NHESP Rare Species Habitat Atlas (2017).
BioMap2 Core Habitat	NHESP	Not present	Project site is not within mapped BioMap2 Core Habitat, as mapped by NHESP and available through OLIVER, the MassGIS data viewer.
Critical Natural Communities	NHESP	Not present	Project site is not located within a mapped Critical Natural Community, as mapped by NHESP and available through OLIVER, the MassGIS data viewer.
Prime Agricultural Soils	NRCS	Present	Portions of the project site are mapped as Swansea Muck, identified as a Farmland of Unique Importance.
Current and historic aerial photography	Google Earth, historicalaerials	1938, 1955, 1995 - 2018	See discussion of aerial imagery below
Wetlands	MA DEP, Parcel Specific Delineation	Present	BSC has delineated wetlands on the project site.
Flood zones	FEMA	Present	Portions of the project site lie within FEMA Zone AE
Areas of Critical Environmental Concern (ACEC)	MA DCR	Not present	Project parcel does not lie within mapped ACEC, as indicated by the current data available through OLIVER.
Important Bird Areas (IBA),	NAS	Not present	The project parcel does not lie within an IBA, and the nearest mapped IBA is Fresh Pond, approximately 1200 meters away. An additional IBA, the Mystic Valley Watershed, is mapped within 1800 meters.

^{*}Full Organizational names:

NHESP - Natural Heritage and Endangered Species Program

NRCS - Natural resources Conservation Service

MA DEP – Massachusetts Department of Environmental Protection

NAS - National Audubon Society

3.2.1 Historical Site Context

Aerial photography available on Google Earth was reviewed to evaluate changes in land use and cover type. The earliest imagery provided on the Google Earth platform was from 1995, and this image shows no change in the landscape context or use of the property over the twenty-five year period available for review.

Using historicalaerials.com, we were able to review aerial photography from 1938 and 1955, and subsequent years leading into the modern era. In the late 1930s, the property was in active farming with a



number of distinct fields defined. Route 2 had been established several years prior (1935 or so) cutting off everything to the south of the property, and housing development was beginning to hem in the property from the north, though there was still a partial connection to the Spy Pond area with the exception of housing along Lake Street which fragmented the property from Spy Pond.

By 1955, farming had clearly been abandoned on the property, and more intensive housing development had occurred in the neighborhood of Dorothy Road and Littlejohn Street. In fact, by 1955, all of the housing in the neighborhood directly north of the property was in existence.

This parcel continued to revert to forest on the abandoned agricultural fields following the 1930s, and has been physically isolated from other natural areas for nearly 100 years.

3.2.2 Wetlands

Wetland delineations for this project site have been conducted and contested several times over nearly 20 years. We carefully reviewed current delineations and FEMA floodplain designations to plan survey plot locations to provide useful characterization of the parcel with respect to the current, significantly reduced Revised Site Plan (September 28, 2020).

The revised plan proposes no impact to Isolated Wetland (local), Bordering Vegetated Wetland, 25' No Disturb Zones for Isolated or Bordering Vegetated Wetlands, and significantly reduces proposed impacts to 100' Buffer and AURA associated with Bordering Vegetated Wetland and to Floodplain resources on the site.

Field data collection was planned for four (4) locations in AURA-BVW, three (3) locations in FEMA Floodplain, two (2) locations in possible Compensatory Flood Storage sites, and one (1) location in a very small Isolated Area on the northeast of the site that has been delineated as a wetland previously and which has had some question raised about possible function as a vernal pool. Two of the ten survey points were situated within the encampment and were therefore not included in the survey (see below).

3.3 FIELD SURVEY

3.3.1 AURA Survey Locations

AU-B9 Terrestrial deciduous forest with dense shrub layer

Tree canopy 35% cover composed of Ash (20%), Norway maple (10%), Black Locust (5%)

Shrub layer 20% cover composed of rose (15%), Chokeberry (Tr)

Vines present include Oriental Bittersweet (20%)

Herbaceous layer 70% composed of Garlic Mustard

Topography is gently sloping, dry loamy soil with thin litter and duff layer

There is a large amount of downed woody debris (30% cover) with a high fuel load

One snag > 4" DBH; few cavities observed

Few small mammal burrows observed

Evidence of dumping including concrete and macadam

Extensive invasive exotic plants



AU-C10 Terrestrial deciduous forest with well-developed shrub layer

Tree canopy 75% composed of Silver Maple (50%), Poplar (10%), Ash (10%) and Cherry (Tr)

Shrub layer 20% cover composed of Box Elder (10%), Elm (10%)

Vines including Oriental Bittersweet and grape present (20%)

Herbaceous layer composed of Garlic Mustard (70%) and Japanese Knotweed (20%)

Topography is gently sloping toward C-series wetland

There is a large amount of downed woody debris (40% cover) with moderate fuel loads

Three snags > 4" DBH, few cavities observed

No small mammal burrows observed

Evidence of human disturbance including refuse

Extensive exotic invasive plants

AU-C16 Terrestrial deciduous forest

Tree canopy 65% cover with Tree of Heaven (30%), American Elm (10%), and Cherry (5%)

Tree sub-canopy layer composed of very old fruit trees (25%)

Tangled shrub layer of Amur Honeysuckle (5%), vines (20%) including Bittersweet

Herbaceous layer 75% cover composed of Garlic Mustard

Topography is gently sloping toward C-series wetland

There is a small amount of downed woody debris (15%) with moderate fuel loads

No snags >4" DBH; no cavities observed

No small mammal burrows observed

Significant amount of trash and waste materials in this location

Extensive exotic invasive plants

AU-D18 Terrestrial deciduous forest with relatively open understory

Tree canopy 75% composed of Black Cherry (70%) and Silver Maple (5%)

Tree sub-canopy and shrub layer 30% with Black Cherry, Poison Sumac, and Tree-of-Heaven Shrub and herbaceous layer 60% composed of American Pokeweed, Goldenrod, Buckthorn

Topography is essentially flat

There is only a trace amount of downed woody debris with a moderate fuel load

There are several snags >4" DBH (Tree-of-Heaven) and Cherry; few cavities

No small mammal burrows observed

Immediately adjacent to the largest encampment on the property.

Survey Plot has the least Garlic Mustard on the site

Evidence of dumping including concrete and macadam

Impact of highway evident



3.3.2 Floodplain Survey Locations

FP-1 Terrestrial deciduous forest with moderate understory

Tree canopy 80% composed of Cherry (60%), Box Elder (20%) and Black Oak (5%) Understory composed of brambles, Chokecherry (10%), American Pokeweed (10%) Herbaceous layer 80% composed of Garlic Mustard (70%), Goldenrod (5%)

Topography is generally flat

There is a moderate amount of downed woody debris (25%) and moderate fuel load One snag 4" DBH present

Invasive exotic shrubs/vines are present but sparse, including Bittersweet, Knotweed There are abundant plants that produce food for wildlife
Some evidence of the homeless encampment, including trash within survey plot
Evidence of dumping including concrete and macadam

FP-2 Terrestrial deciduous forest with fairly open understory

Tree canopy 80% with Ash (20%), Norway Maple (40%), Red Maple (10%), Elm (5%) Tree sub-canopy and shrub layer composed of Cherry (5%), Norway Maple (5%) Herbaceous layer 90% composed of Garlic Mustard, Sensitive Fern, ivy

Topography is generally flat

Small amount of downed woody debris, including 18" DBH trunk, moderate fuel load

Survey plot includes some very large trees, including specimens of 24" and 30" DBH Site is close to Dorothy Road and there is evidence of yard waste dumping Evidence of dumping concrete macadam

FP-3 Located within encampment and therefore not surveyed

3.3.3 Possible Compensatory Storage Locations

CS-1 Terrestrial deciduous forest with open understory

Tree canopy 100% composed of Norway Maple. Elm and Cherry present (Tr) Understory has trace amount of Linden and Bittersweet

Topography gently sloping to the west Small amount of downed wood debris (5%) with moderate fuel load No snags observed; no cavities observed No small mammal burrows observed

Some residential encroachment of lawn area, but no other evidence of impacts Garlic mustard is present outside of plot at fence line

CS-2 Located within encampment and therefore not surveyed



3.3.4 Isolated Area

IA-1 Distinct topographic depression
Cottonwood trees on edge of basin
Knotweed and ferns in basin

This was evaluated for vernal pool habitat potential and does not meet such criteria

3.3.5 Wildlife Observations

Few animals were observed during the field survey on October 27, 2020. A dead Eastern gray squirrel (*Sciurus carolinensis*) was observed at the forest edge, opposite 65 Dorothy Road. An Eastern Cottontail rabbit (*Sylvilagus floridanus*) was observed near Plot IA-1. Fresh canid scat was found at Plot AU-B9. It is believed to be that of Eastern Coyote (*Canis latrans*), given apparent contents of the droppings (Photo AU-B9 #867).

Several birds were heard or observed within the forested parcel. Species included Northern Cardinal (*Cardinalis cardinalis*), Black-capped Chickadee (*Poecile atricapillus*), Blue Jay (*Cyanocitta cristata*), Downy Woodpecker (*Picoides pubescens*) and American Robin (*Turdus migratorius*).

Residents of the abutting neighborhood have stated that they have observed increased pest species activity, including rats. No evidence of rats or other pest species was observed during the field survey.

4.0 **SUMMARY OF FINDINGS**

4.1.1 Site Context

Fragmentation and isolation of forest patches have long-term adverse impacts on forests and wildlife habitat values associated with isolated patches. Fragmentation reduces overall forest health and leads to a loss of biodiversity, and increases invasive plants, pests, and pathogens. Isolation at the landscape scale inhibits the movement of plants and animals over the long-term.

As discussed above, the subject parcel has been isolated for nearly a century, since the construction of Route 2 on its south and the development of dense housing to its north. There is a greenway connection to Spy Pond and the Mystic River through existing bike paths, which mitigates the effects of isolation to a certain degree, but this remains a significantly isolated and therefore compromised patch of forest.

4.1.2 Important Wildlife Habitat Features

Survey plots were established in locations where direct impact to Arlington Bylaw Adjacent Upland Resource Areas (AURAs) is proposed or immediately adjacent, and to Floodplain sites that would be directly affected by proposed work, as well as to two locations where Compensatory Storage may be proposed for the project.

Using the Wetlands Protection Act Wildlife Habitat Protection Guidance, Appendix B: Detailed Wildlife Habitat Evaluation as a basis for site evaluation, BSC Group evaluated the project site for features that provide important wildlife habitat.



- Wetland/Aquatic Food Plants were not detected in survey plots. This is a result of locating plots primarily in AURA and floodplain locations. No plots were established within the flagged wetlands. Upland Food Plants are present on the project site, found in several of the survey plots. The project will not adversely affect availability of wetland plants that are important for wildlife food, but may marginally diminish available upland wildlife food plants. Mitigation of this impact could be accomplished with careful landscape planning.
- The property is characterized by numerous large trees, many of which are near or in excess of 30" DBH. We did not conduct an inventory of such trees as part of this evaluation, but they were present at five (5) of the eight (8) survey plots. Large trees were mostly living, and there were few dead standing trees across the site, and relatively few snags or cavities, considering the extensive amount of downed woody debris.
- The most significant feature found throughout the site is the extensive amount of downed woody debris. Each survey plot was characterized by a large amount of woody debris, from very small, typically abundant fuel wood to a number of quite large downed tree trunks. This feature can be particularly valuable to small mammals, reptiles and amphibians. The project may reduce available downed woody debris within the small amount of jurisdictional resource area proposed for alteration. However, we believe that the proportion of available woody debris on the site will not be adversely affected due to its abundance at all survey plots. Mitigation of this impact could be accomplished by placing coarse woody debris in compensatory storage areas or in AURA zones and with careful consideration in landscape design and implementation.
- Rocks, rock piles, and debris were also abundant on the project site, which can all provide valuable cover objects for small mammals, reptiles and amphibians.
- There was no suitable turtle nesting habitat, nor wetlands likely to support rare species. The large wetland on site (Series C) is dominated by Phragmites, and as such not expected to provide important waterfowl habitat.
- There are no depressions that appear to provide likely vernal pool habitat on the site.

4.1.3 Invasive Species

The site is characterized by the presence of invasive exotic plant species throughout most survey plots. Garlic Mustard is especially abundant throughout the site, dominating the herbaceous layer of the forest. Garlic Mustard forms dense stands and crowds out native plants. It is also allelopathic, affecting suitability of soil to native plants. Alteration of a native flora by invasive plants is known to alter the value of forest and wetland habitats for wildlife. The abundance of Garlic Mustard, and presence of Japanese Knotweed and Oriental Bittersweet at most survey sites has a significant adverse effect on wildlife.

4.1.4 Human Encampment

Two survey plots, FP-3 and CS-2, were located directly within the human encampment located on the property and therefore not surveyed. There is no suitable habitat value to an area with extensive, on-going habitation.

It is important to note the adverse effects on wildlife habitat values in the forest and wetlands on the project site resulting from the extensive human encampment. The extensive amount of trash that is spread throughout the site has a direct effect of eliminating important wildlife habitat functions. Trash may be construed to provide shelter for some species, and may attract prey organisms, but it eliminates natural



cover, may introduce toxins to soil and water resources, and expands the footprint of human habitation which most wildlife make an effort to avoid.

The encampment on the site of the proposed project has a direct negative impact on the wildlife habitat values of the woods and wetlands.

5.0 **CONCLUSION**

The BSC Group investigation of the Wildlife Habitat and Vegetation on the site of the proposed Thorndike Place project identified suitable resources for common wildlife species that would normally be expected in an urban/suburban forest fragment of this size. Rabbit, squirrel, and (presumed) coyote were seen, along with a variety of passerine birds. Raccoon, skunk, fox, and possibly deer, and other human-adapted or human-tolerant species are likely to occur in this patch of woods over time. Wetlands on site could also support some species of frog, and the surrounding woods might provide non-breeding habitat for these.

The site is largely isolated from surrounding natural areas which significantly reduces its wildlife habitat value. The forest's potential habitat value is further diminished by extensive invasive exotic plants throughout the site, and by the large human presence on the property.

The current revised proposed project has eliminated a significant amount of direct wetland, buffer zone, and Adjacent Upland Resource Area impacts. The project's effects on wildlife habitat values of the jurisdictional resource areas on the project site have been reduced dramatically from earlier proposals. Through careful design and implementation of flood storage mitigation areas and thoughtful, wildlife-focused landscape planning, the project should have a net beneficial outcome on the wildlife habitat values of the project site.





AU-B9 #866: Survey plot has a dense tangle of bittersweet, rose, and downed woody debris. A large Ash tree dominates the canopy.



AU-B9 #867: Canid scat observed in Survey Plot



AU-C10 #871: Large Silver Maple tree amid generally sparse understory and moderate course woody debris



AU-C10 #873: Open understory with course woody debris and small stand of Japanese Knotweed



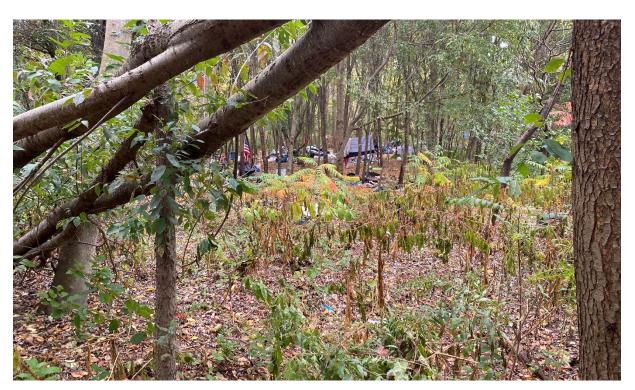
AU-C16 #878: Old apple/fruit trees and refuse associated with encampment.



AU-C16 #880: Garlic mustard understory



AU-D18 #881: Cherry and maple make up the canopy trees, and the understory is fairly diverse, with American Pokeweed and Goldenrod dominant.



AU-D18 #882: Homeless encampment has a significant effect on wildlife habitat values of forest and wetlands on the site.



FP-1 #876: Relatively open understory with coarse woody debris and mature overstory trees.



FP-1 #877: Oak and chokecherry occur over garlic mustard



FP-2 #874: Large mature trees in overstory, with a sparse understory and a lot of coarse woody debris.



FP-1 #875: Area has sensitive fern and poison ivy and other indicators of moist floodplain conditions.



CS-1 #869: Very open understory under complete canopy of a large Norway Maple.



CS-1 #870: Survey Plot was very sparse in the understory and ground cover, with some coarse woody debris.



IA-1 #885: Distinct depression with stand of Japanese Knotweed. No vernal pool characteristics.



FP-1 #877: Very large Cottonwood trees in close proximity to IA-1 depression

A. Identifiers (general EOR information)		
1. Community type (observed):	2. GF	PS Point: 42 46/33@ 71 15/230
5. Prosigned type (timest use).	4. Lat	. N Long W
5. Site name: Thornoist Plan	6. Quad name	e(s):
7. Ecoregion (DFW):	8. County nar	ne(s):
9. Town: Arbigran	10.Directions:	
11. Survey date 10/27/26	12. Previous observations at this site:	
13. Surveyors: MRSurve		
B. Environmental Description	341	
14. PLOT # AU 13.9	15. Photos taken (V) N; 0866, 0867 Identifier MB thorn 2	16. Elevation (from topo): m or ft
17. Topographic position: Summit/Crest	18. Topographic sketch:	20. Slope Class (Percent):
		Flat (<2%) Steep (48-95%) Gentle (2-9%) Very Steep (>95%)
Mid slope Toe of slope		Moderate (10-25%)
Low slope	THE STATE OF THE S	Abrupt (cliff or ledge)
Rolling Terrain Level Channel wall		Rather Steep (26-47%)
Level Channel wall Basin floor Channel bed		21. Slope Shape:
Other Slight rise	19. Slope aspect:	Vertically: Concave Convex Linear Horizontally: Concave Convex Linear
22. Downed Wood (within or partially within plot)	25. Un-vegetated surface (check the single, most dominant feature):	28. Moisture regime:
Max. diameter/length/decay class:	single, most dominant leature).	Very dry
15' Partial	Bedrock	DryWet
Average diameter for all downed wood ≥4 in.	Large rocks (boulders > 24 in.) Small rocks (stones 10-24 in.)	MoistSaturated
5" (estimate)	Small rocks (stones 10-24 m.) Cobbles (2-9 in.)	Dania di sa llyrinyun data d
Abundance of downed wood ≥4 in. diameter	Gravel (<2 in.)	Periodically inundatedPermanently inundated
(using cover classes)302_	Sand Litter	i critianently mandated
23. Fuel load (< ¼ inch in diameter):	Bare soil	
Low = 1 Moderate = 2 High = 3	— Water	
	Other:	29. Soil type (if observed)
A. Snags ≥ 4" DBH: Species DBH ht.	381	sand loam
Ast 15 20	26. Combined litter & duff depth:	claypeat muck
	1 inches	
		other
	27. Parent material: _/oum.	
0. Sphagnum hummocks overhanging vater: (only if >25 m ² and visible from plot)	31. Evidence of Land Use History:	32. Evidence of Disturbance:
GPS point (location):	stone walls, barbed wire, wolf	Fires: fire scars, charcoal, standing snags
Size of habitat:	trees	Blowdowns: aligned downed trees
3 water depths (max.	cut stumps, multi-trunk trees,	Ice damage: broken tree tops
inches)	foundations, wells	Disease: adelgid, gypsy moth, beech bark
Circle: Moving-channels or Pools of Water	Other <u>Variement</u> , concrete	Other: /nua fives
Comments:	ogeneity, erosion / sedimentation, invasive specie	
Robbing Collins	ogeneny, erosion / semmemation, invasive specie	es presence/distribution, etc:
Fresh seal- could be conote	able, but fairly small	nstery
Downed wood carbider	able but fasches small	188 of 842

												į.											
Store of a					÷		Carli musta		1	B. Hersmeek	Chokeberry	8	Black locust	Sucamort	Kowan praph	ASA	41. Plant Species & abundance: list each species and the corresponding cover class for each stratum.	39. Photo Cover Type:	Annual	Sem-Evergreen Evergreen	Semi-deciduous	.Y	C. VEGETATION 34. System:
?) scart	-						5	in the second		20	75	5/	8	F.	76	20	t each species and the correspond	39a. Field-Obse	Herbaceous		Sparse woodland	38. Physiognomic type:	Terrestrial Palustrine
			-														ding cover class for each stratur	39a. Field-Observed Cover Type: Forest w	Sparsely vegetated		Scrub thicket		Estuarine
	ā			**			*			#2 							n.	den's		(et		40. Stra	35. PLOT NUMBER:
																		H Herbaceous N Non-vascular V Vine / liana	S1 Tall shrub S2 Short shrub	Tree sub-canopy	Emergent tree	40. Strata/life forms <u>height</u>	AU B9 36. Plot D
				0		4						*)						15 15	3 20	10	A ST	height (m or ft) % cover	36. Plot Dimensions: 26 6
e							9		-									5 > 75%	4 = 51-75%	2=6-25%	+ <1% 42	Cover Classes	6 M

A. Identifiers (general EOR information)		
	2. G	
	4. La	
5. Site name: 7. Ecoregion (DFW):	6. Quad nam	e(s):
9. Town: Actineson	8. County na	me(s):
9. Town. Zyrrigation	10.Directions:	FION OVE C'O
11 Survey date 10/27/20	12 Previous observations at this cite:	
11. Survey date 10/27/26 13. Surveyors: MR Rume	12. I levious observations at this site.	
N		
B. Environmental Description	(1)	T
14. PLOT # AU CIO	15. Photos taken (Y) N; Identifier 871, 872, 873	16. Elevation (from topo): m or ft
17. Topographic position: Summit/Crest High slope Mid slope Low slope Rolling Terrain Level Basin floor Other Toe of slope Channel wall Channel bed	18. Topographic sketch: 19. Slope aspect: 270 to E	20. Slope Class (Percent): Flat (<2%) Steep (48-95%) Gentle (2-9%) Very Steep (>95%) Moderate (10-25%) Abrupt (cliff or ledge) Rather Steep (26-47%) 21. Slope Shape: Vertically: Concave Convex Linear Horizontally: Concave Convex Linear
22. Downed Wood (within or partially within plot) Max. diameter/length/decay class: //// 30 Average diameter for all downed wood ≥4 in. (estimate) Abundance of downed wood ≥4 in. diameter (using cover classes) 40 7. 23. Fuel load (< ¼ inch in diameter): Low = 1 Moderate = 2) High = 3 24. Snags ≥ 4" DBH: Species DBH ht. 6 15 4 5 4 5 4 5 4 5 4 5 4 5 4 5	25. Un-vegetated surface (check the single, most dominant feature): Bedrock Large rocks (boulders > 24 in.) Small rocks (stones 10-24 in.) Cobbles (2-9 in.) Gravel (<2 in.) Sand Litter Bare soil Water Other: 26. Combined litter & duff depth: inches	28. Moisture regime: Very dryWet
		E
30. Sphagnum hummocks overhanging water: (only if >25 m ² and visible from plot)	31. Evidence of Land Use History:	32. Evidence of Disturbance:
GPS point (location):	stone walls, barbed wire, wolf	Fires: fire scars, charcoal, standing snags
Size of habitat:	trees	Blowdowns: aligned downed trees
3 water depths (max.	cut stumps, multi-trunk trees,	Ice damage: broken tree tops
inches)	foundations, wells	I have been a second and a second a second and a second a
Circle: Moving channels or Pools of Water	Other Myanves	Disease: adelgid, gypsy moth, beech bark
Comments:		Other:
33. Environmental Comments: vegetation home		es presence/distribution, etc:
Knot useed, Garlic.	pustard,	
Bluese tree Apen	108	100 of 942

To pol	B. Howwell	Enotweed Constant	1804 81der		39. Photo Cover Type: 41. Plant Species & abundance: lis	37. Leaf phenology: Deciduous Semi-deciduous Semi-Evergreen Evergreen Perennial Annual	C. VEGETATION 34. System:
16	10	20	70	4000	Photo Cover Type: 39a. Field-Observed Cover Type: Plant Species & abundance: list each species and the corresponding cover class for each stratum.	38. Physiognomic type: Forest Sparse woodland Shrubland Dwarf shrubland Sparse dwarf shrubland Herbaceous	N Terrestrial Palustrine
	5			Champion thee in	Cover Type:	Woodland Scrub thicket Sparse shrubland Dwarf scrub thicket Non-vascular Sparsely vegetated	Estuarine 35. PLOT NUM
				0/at 28"		40. Strata/life forms T1 Emergent tree_ T2 Tree canopy_ T3 Tree sub-canopy S1 Tall shrub_ S2 Short shrub	BER: AU GIO
				din pack of 5 5	15 30	height (m or ft) % cover 80 26 10	36. Plot Dimensions: 75
				Gent X	5>75%	<u>Cover Classes</u> $+<1\%$ $1=1-5\%$ $2=6-2\%$ $3=26-4\%$ $4=51-75\%$	-

A. Identifiers (general EOK information)	2. GP	15 Paint 47 40/109 71 1000/16
	4. Lat	
	6. Quad name 8. County nam	
9. Town: Drlington		
11. Survey date 10/27/20 13. Surveyors: MR Borne	12. Previous observations at this site;	
B. Environmental Description		di di
14. PLOT #	15. Photos taken (V) N;	16. Elevation (from topo): m or ft
A4016	Identifier <u>0878</u> , 0879,0880	Tot Zio anon (Arom topo).
17. Topographic position: Summit/Crest High slope Mid slope Low slope Rolling Terrain Level Channel wall	18. Topographic sketch: Swift Swi	20. Slope Class (Percent): Flat (<2%)
Basin floor Channel bed Other	19. Slope aspect. Z+ Z	Vertically: Concave Convex Linear Horizontally: Concave Convex Linear
22. Downed Wood (within or partially within plot)	25. Un-vegetated surface (check the single, most dominant feature):	28. Moisture regime:
Max. diameter/length/decay class: Average diameter for all downed wood ≥4 in. (estimate) Abundance of downed wood ≥4 in. diameter (using cover classes) 23. Fuel load (< ¼ inch in diameter): Low = 1 Moderate = 2 High = 3 24. Snags ≥ 4" DBH: Species DBH ht.	Bedrock Large rocks (boulders > 24 in.) Small rocks (stones 10-24 in.) Cobbles (2-9 in.) Gravel (<2 in.) Sand Litter Bare soil Water Other: 26. Combined litter & duff depth: inches 27. Parent material:	Very dry Dry Moist Wet Saturated Periodically inundated Permanently inundated 29. Soil type (if observed) sand clay peat muck other
30. Sphagnum hummocks overhanging	31. Evidence of Land Use History:	32. Evidence of Disturbance:
water: (only if >25 m ² and visible from plot) GPS point (location): Size of habitat:	stone walls, barbed wire, wolf trees	<u>Fires</u> : fire scars, charcoal, standing snags <u>Blowdowns</u> : aligned downed trees
3 water depths (max.	cut stumps, multi-trunk trees,	Ice damage: broken tree tops
inches)	foundations, wells	
Circle: Moving channels or Pools of Water	Other Old fruit freer	Disease: adelgid, gypsy moth, beech bark
Comments:	Cots of Svarh	Other:
33. Environmental Comments: vegetation home	ogeneity, erosion / sedimentation, invasive speci nent. Coprous trash my. 45 of trash	es presence/distribution, etc:
Tangled under ste	eny. ests of track	192 of 842

Cardina c			Sandy bus		R H Coll	Trank of the	have larver	343					Children Jahr		0	/ hess w	Anne I ma	Millanthiat	41. Plant Species & abundance: list of	39. Photo Cover Type:	Annual	Sem-Evergreen Evergreen	Semi-deciduous	7. Leaf phenology:	C. VEGETATION 34. System:
idente observed			16150 >6		7000	1 () G () 90	inte 5 X	-			-	//	abalis 25		(TR	5/m 10	30	Plant Species & abundance: list each species and the corresponding cover class for each stratum.	39a. Field-Observed Cover Type:	Herbaceous	Dwarf shrubland	Sparse woodland	gnomi	√ Terrestrial Palustrine
	1.4						- 111								32				over class for each stratum.	Cover Type: Function	Sparsely vegetated	Dwarf scrub thicket	Woodland Scrub thicket Sparse shuhland		Estuarine 35. PLOT NUMBER: AU
						7								74						H Herbaceous N Non-vascular V Vine / liana	S1 Tall shrub S2 Short shrub	T3 Tree sub-canopy		40. Strata/life forms	BER: AU 0/6 36.
									,	9	1.0									75	0) 01;		24	height (m or ft) % cover	Plot Dimensions: 25
											1.2					21				5 > 75%	1 1			ver Cover Classes	Rad

A. Identifiers (general EOR information)		
1. Community type (observed):	2. GI	PS Point: 42 401132 71 149 118
3. Assigned type (NHESP use):	4. La	t:W
5. Site name:	6. Quad name	e(s):
/. Ecolegion (Dr w):	8. County nat	me(s):
9. Town: Arthyfoli	10.Directions;	
11. Survey date 16/27/26 13. Surveyors: Mr. Share B. Environmental Description	12. Previous observations at this site:	
14. PLOT # AU D/8	15. Photos taken (Y) N;	16. Elevation (from topo): m or ft
pro 0 o	Identifier 088/ - 0883	
17. Topographic position: Summit/Crest High slope Step in slope Mid slope Toe of slope Low slope Rolling Terrain Level Channel wall Basin floor Channel bed Other	18. Topographic sketch: I I I I I I I I I I I I I I I I I I I	20. Slope Class (Percent): Flat (2%) Steep (48-95%) Gentle (2-9%) Very Steep (>95%) Moderate (10-25%) Abrupt (cliff or ledge) Rather Steep (26-47%) 21. Slope Shape: Vertically: Concave Convex Linear Horizontally: Concave Convex Linear
22. Downed Wood (within or partially within plot) Max. diameter/length/decay class: Average diameter for all downed wood ≥4 in. (estimate) Abundance of downed wood ≥4 in. diameter (using cover classes) 23. Fuel load (< ½ inch in diameter): Low = 1 Moderate = 2 High = 3 24. Snags ≥ 4" DBH: Species DBH ht. All and (3) All and (4) DBH ht.	25. Un-vegetated surface (check the single, most dominant feature): Bedrock Large rocks (boulders > 24 in.) Small rocks (stones 10-24 in.) Cobbles (2-9 in.) Gravel (<2 in.) Sand Litter Bare soil Water Other: 26. Combined litter & duff depth: inches 27. Parent material:	28. Moisture regime: Very dry Dry Moist Saturated Periodically inundated Permanently inundated 29. Soil type (if observed) sand clay peat muck other
30. Sphagnum hummocks overhanging	31. Evidence of Land Use History:	32. Evidence of Disturbance:
water: (only if >25 m ² and visible from plot)	stone walls, barbed wire, wolf	Fires: fire scars, charcoal, standing snags
GPS point (location):	trees	
Size of habitat:	cut stumps, multi-trunk trees,	Blowdowns: aligned downed trees
3 water depths (max. inches)	foundations, wells	Ice damage: broken tree tops
Circle: Moving channels or Pools of Water	Other Chambes of pavement	Disease: adelgid, gypsy moth, beech bark
Comments:		Other:
Chicalee Flyin, Bu.	geneity, erosion / sedimentation, invasive species Mat w Seme topogram	es presence/distribution, etc: Ondula fra
Sugar Grean + Lone le	is incomposent be	194 of 842

				Snitules	Buckthach	Collin Food	Somerican Pole Word	2.000	1 miles	Rlack Cherry	Poson Sumack		and the same	S. J. S.	Black Chita	41. Plant Species & abundance: list each species and the corresponding cover class for each stratum.	39. Photo Cover Type: 39		Perennial Spar Annual Her	green	, , , , , , , , , , , , , , , , , , ,	OT. Of Security	O VEGETATION 34 System: Terrestrial
				7	7	80	8		1	15	1	24)		7	260	d the correspondin	39a. Field-Observed Cover Type:		Sparse dwarf shrubland Herbaceous	Shrubland Dwarf shrubland	St.	nomic type:	Palustrine
										Entraces a tall				r	8° 1, 12" DEL	g cover class for each stratum.	ed Cover Type:			Sparse shrubland Dwarf scrub thicket	Woodland		Estuarine 35. PLOT NUMBER:
										how been							1			T2 Tree canopy	T1 Emergent tree	40. Strata/life forms	AUD-18
													5						- M	80		height (m or ft)	36. Plot Dimensions:
		i a															Q	8	500	25		% cover	32
																		5 > 75%	3 = 26 - 50% 4 = 51 - 75%	1 = 1 - 5%	+<1%	Cover Classes	Rad

least Garlic Mustered of for a sie

A. Identifiers (general EOK information)	2.0	PS Point: 42 40 373 71 14988
1. Community type (observed):		t. N. Long W
	6. Quad name	
9. Town: Arling In	8. County na	me(s)
7. TOWN.	To Directions.	
11. Survey date 10/27/26 1/	30 A 12 Previous observations at this site:	
13. Surveyors: IN Borne		
B. Environmental Description		
14. PLOT #	15. Photos taken Y N;	16. Elevation (from topo): m or ft
+ 1	Identifier <u>0874</u> 0877	
17. Topographic position: Summit/Crest High slope Mid slope Low slope Rolling Terrain Level Channel wall	18. Topographic sketch:	20. Slope Class (Percent): Flat (<2%) Steep (48-95%) Gentle (2-9%) Very Steep (>95%) Moderate (10-25%) Abrupt (cliff or ledge) Rather Steep (26-47%)
Basin floor Channel bed	1	21. Slope Shape:
Other flow plans	19. Slope aspect:	Vertically: Concave Convex Linear Horizontally: Concave Convex Linear
22. Downed Wood (within or partially within plot)	25. Un-vegetated surface (check the single, most dominant feature):	28. Moisture regime:
Max. diameter/length/decay class: Average diameter for all downed wood ≥4 in.	Bedrock Large rocks (boulders > 24 in.) Small rocks (stones 10-24 in.) Cobbles (2-9 in.) Gravel (<2 in.) Sand Litter Bare soil Water Other:	Very dry Dry Moist Saturated Periodically inundated Permanently inundated 29. Soil type (if observed)
24. Snags ≥ 4" DBH:	***************************************	sandloam
Species DBH ht.	26. Combined litter & duff depth:	claypeatmuck
		other
	27. Parent material:	
30. Sphagnum hummocks/overhanging water: (only if >25 m² and visible from plot)	31. Evidence of Land Use History:	32. Evidence of Disturbance:
GPS point (location):	stone walls, barbed wire, wolf	<u>Fires</u> : fire scars, charcoal, standing snags
Size of habitat:		Blowdowns: aligned downed trees
3 water depths (max.	cut stumps, multi-trunk trees,	Ice damage: broken tree tops
inches)	foundations, wells	11
Circle: Moying channels or Pools of Water	Other Chunks of pavement	Disease: adelgid, gypsy moth, beech bark
Comments:	- 8 boicks, the	Other:
33. Environmental Comments: vegetation home Some enider end	ogeneity, erosion/sedimentation, invasive spec	
		196 of 842

Terrestrial Palustrine Estuarine 35. PLOT NUMBER: Profile 36. Plot Dimensions:
trata/life forms T1 Emergent tree T2 Tree canopy_ T3 Tree sub-cane S1 Tall shrub S2 Short shrub H Herbaceous N Non-vascular V Vine / liana

MA Natural Heritage & Endangered Species Program

MB Thorn 5

A. Identifiers (general EOR information)		190
1. Community type (observed):	2. GI	PS Point: 47 401643 71119676
3. Assigned type (NHESP use):	4. La	::N LongW
5. Site name:	6. Quad name	e(s):
7. Ecoregion (DFW):	& County na	ne(s):
9. Town: Arlington	10.Directions:	
11. Survey date	12. Previous observations at this site:	
B. Environmental Description		
14. PLOT #	15. Photos taken (V) N; 374,875	16 Fl. 11 (6
FRZ	Identifier MB Thorn 5	16. Elevation (from topo): m or ft
17. Topographic position: Summit/Crest High slope Mid slope Low slope Rolling Terrain Level Basin floor Other Step in slope Toe of slope Channel wall Channel bed	18. Topographic sketch: 19. Slope aspect:	20. Slope Class (Percent): Flat (<2%) Steep (48-95%) Gentle (2-9%) Very Steep (>95%) Moderate (10-25%) Abrupt (cliff or ledge) Rather Steep (26-47%) 21. Slope Shape: Vertically: Concave Convex Linear Horizontally: Concave Convex Linear
22. Downed Wood (within or partially within plot) Max. diameter/length/decay class: Average diameter for all downed wood ≥4 in. (estimate) Abundance of downed wood ≥4 in. diameter (using cover classes) 23. Fuel load (< ¼ inch in diameter):	25. Un-vegetated surface (check the single, most dominant feature): Bedrock Large rocks (boulders > 24 in.) Small rocks (stones 10-24 in.) Cobbles (2-9 in.) Gravel (<2 in.) Sand Litter Bare soil Water	28. Moisture regime: —
Low = 1 Moderate 2 High = 3 24. Snags ≥ 4" DBH: Species DBH ht. 18 7	26. Combined litter & duff depth:inches 27. Parent material: Minches	29. Soil type (if observed) sandloampeatmuck other
30. Sphagnum hummocks overhanging	31. Evidence of Land Use History:	32. Evidence of Disturbance:
water: (only if >25 m² and visible from plot) GPS point (location): Size of habitat: 3 water depths		
	buses, evidence of y	

San			The state of the s	La IN MU	Sixual in	1.74			your country	Newson Ward	Cherry		(,	Flori	all shaple	Newway INA	46	41. Plant Species & abundance: list	39. Photo Cover Type:	Perennial	Semi-Evergreen Evergreen	Semi-deciduous	ğ	C. VEGETATION 34. System:
Same Very large		,	7	(2012) 96	5				Have . K	5	5			N		A 2	20	Plant Species & abundance: list each species and the corresponding cover class for each stratum.	39a. Field-Observed Cover Type:	Herbaceous	Shrubland Dwarf shrubland	Sparse woodland	38. Physiognomic type:	Terrestrial Palustrine
her, Good a															30° diameter	24" Stametar	24" diameter	cover class for each stratum.	d Cover Type:	1		Woodland Scrub thicket		Estuarine 35. PLOT N
wasty of fre	•																		H Herkaceous N Non-vascular V Vine / liana	S1 Tall shrub S2 Short shrub	Tree sub-canopy		40. Strata/life forms he	PLOT NUMBER: 6 26. PI
Les 200		9		-									:45						40	15	750		height (m or ft) % cover	Plot Dimensions:
											4	,	×						5 > 75%	4 = 51-75%	2 =6-25%	+ <1% 42	Cover Classes	W.

A. Identifiers (general EOR information)		1
1. Community type (observed):	2. GI	PS Point: 42. 40/566 71. 1520/9
3. Assigned type (NHESP use):	4. La	t:N Long W
5. Site name:	6. Quad name	e(s):
7. Ecoregion (DFW):	8. County nat	me(s):
9. Town: Artinton	10.Directions: Jases measur	ed 23m from buk wall of
11. Survey date 10/27/20 13. Surveyors: MRB	12. Previous observations at this site:	
B. Environmental Description 14. PLOT #	15. Photos taken (V) N; 0869, 870 Identifier	16. Elevation (from topo): m or ft
17. Topographic position: Summit/Crest High slope Mid slope Low slope Rolling Terrain Level Basin floor Other 22. Downed Wood (within or partially within plot) Max. diameter/length/decay class: Average diameter for all downed wood ≥4 in. (estimate) Abundance of downed wood ≥4 in. diameter (using cover classes) 23. Fuel load (< 1/2 inch in diameter): Low = 1 Moderate = 2 High = 3 24. Snags ≥ 4" DBH: Species DBH ht.	18. Topographic sketch: 19. Slope aspect: 25. Un-vegetated surface (check the single, most dominant feature): Bedrock Large rocks (boulders > 24 in.) Small rocks (stones 10-24 in.) Cobbles (2-9 in.) Gravel/(<2 in.) Sand Litter Bare soil Water Other: 26. Combined litter & duff depth:	20. Slope Class (Percent): Flat (<2%) Steep (48-95%) Gentle (2-9%) Very Steep (>95%) Moderate (10-25%) Abrupt (cliff or ledge) Rather Steep (26-47%) 21. Slope Shape: Vertically: Concave Convex Linear Horizontally: Concave Convex Linear 28. Moisture regime: Very dry Dry Moist Saturated Periodically inundated Permanently inundated 29. Soil type (if observed) sand clay peat muck other
30. Sphagnum hummocks overhanging water: (only if >25 m² and visible from plot)	31. Evidence of Land Use History:	32. Evidence of Disturbance:
GPS point (location):	stone walls, barbed wire, wolf	Fires: fire scars, charcoal, standing snags
Size of habitat:		Blowdowns: aligned downed trees
3 water depths (max. inches)	cut stumps, multi-trunk trees, foundations, wells	Ice damage: broken tree tops
Circle: Moving channels or Pools of Water	Other Some ancroud from	Disease: adelgid, gypsy moth, beech bark
Comments:		Other:
33. Environmental Comments: vegetation homo	geneity, erosion / sedimentation, invasive speci	
Sparse understory,		presence distribution, etc.
		000 1010

									The said of the said of the	R. Harrist	T. Warn	1 malin			Newway hash	41. Plant Species & abundance: list each species and the corresponding cover class for each stratum.	39. Photo Cover Type:	Perennial Annual	Semi-deciduous Semi-Evergreen	93 133	C. VEGETATION 34. System:
Not present in plats	L 1 & B. 11									7		7	7	77	100	t each species and the corresponding of	39a. Field-Observed Cover Type:	Sparse dwarf shrubland Herbaceous	Sparse woodland Shrubland	gnomi	TerrestrialPalustrine
	Sin will acond														2.2	cover class for each stratum.	Cover Type: Trols +	Non-vascular Sparsely vegetated	Woodland Scrub thicket Sparse shrubland Sparse shrubland		Estuarine 35. PLOT NUMBER:
	Jack .												.3		55		N Non-vascular V Vine/liana 15	Tall shrub / C Short shrub	Emergent tree #6	40. Strata/life forms height (m or ft) % cover	ABER: 36. Plot Dimensions:
			=		K								3				3 > 13%			Cover Classes	

1. Community type (observed):	2.6	DC Doints
	2. G 4. La	
	6. Quad nam	
7. Ecoregion (DFW):	8. County na	ame(s):
9. Town: Ar Lington	10.Directions:	
11. Survey date	12. Previous observations at this site:	
13. Surveyors: MRBurne		
B. Environmental Description		
14. PLOT # / A - /	15. Photos taken (Y) N; Identifier 0885, 0884	16. Elevation (from topo): m or ft
17. Topographic position: Summit/Crest High slope Mid slope Low slope Rolling Terrain Level Channel wall	18. Topographic sketch:	20. Slope Class (Percent): Flat (<2%) Steep (48-95%) Gentle (2-9%) Very Steep (>95%) Moderate (10-25%) Abrupt (cliff or ledge) Rather Steep (26-47%) 21. Slope Shape:
Basin floor Channel bed Other Cogs of Saan h	19. Slope aspect:	Vertically: Concave Convex Linear Horizontally: Concave Convex Linear
22. Downed Wood (within or partially within plot) Max. diameter/length/decay class:	25. Un-vegetated surface (check the single, most dominant feature): Bedrock Large rocks (boulders > 24 in.)	28. Moisture regime: Very dryDryWetMoist Saturated
Average diameter for all downed wood ≥4 in(estimate) Abundance of downed wood ≥4 in. diameter (using cover classes) 23. Fuel load (< ¼ inch in diameter): Low = 1 Moderate = 2 High = 3	Small rocks (stones 10-24 in.) Cobbles (2-9 in.) Gravel (<2 in.) Sand Litter Bare soil Water Other:	Periodically inundated Permanently inundated
24. Snags ≥ 4" DBH: Species DBH ht	26. Combined litter & duff depth:inches	29. Soil type (if observed) sandloamclaypeatmuck
	27. Parent material:	other
30. Sphagnum hummocks overhanging water: (only if >25 m ² and visible from plot)	31. Evidence of Land Use History:	32. Evidence of Disturbance:
GPS point (location):/	stone walls, barbed wire, wolf trees	Fires: fire scars, charcoal, standing snags
Size of habitat:	cut stumps, multi-trunk trees,	Blowdowns: aligned downed trees
3 water depths (max. inches)	foundations, wells	Ice damage: broken tree tops
Circle: Moving channels or Pools of Water	Other_ Trash	Disease: adelgid, gypsy moth, beech bark
Comments:		Other:
33. Environmental Comments: vegetation homo	geneity, erosion / sedimentation, invasive speci	es presence/distribution, etc:
There is a shift	topographic depre	es presence/distribution, etc: Subn large Coffunction For a Vernal pass 202 of 842
South filled WITH	MET WHEER, CLERKY	202 of 042
were w man	\	2U2 0T 842

								141.110000	(the second	1-4110	Carrie	Varter (41. Plant Species & abundance: list each species and the corresponding cover class for each stratum.	39. Photo Cover Type:	Annual	Evergreen	Semi-deciduous	. <u>®</u>	C. VEGETATION 34. System:
													t each species and the correspon	39a. Field-Obse	Sparse uwan sinubianu Herbaceous	Dwarf shrubland	Sparse woodland	38. Physiognomic type:	Terrestrial Palustrine
	[4]												iding cover class for each stratum.	39a. Field-Observed Cover Type:	Sparsely vegetated	ĨI	Scrub thicket	Woodland	Estuarine 35. PLOT NUMBER:
									í a					H Herbaceous N Non-vascular V Vine / liana				40. Strata/life forms	
														800				height (m or ft) % cover	36. Plot Dimensions:
		ć.												3/13/0	4=51-72%	2=6-25%	- +<1% 1=1-5% 4	Cov	



Sent Via Email

October 22, 2020

www.bscgroup.com

Tel: 617-896-4300

803 Summer Street Boston, MA 02127

Christian Klein, Chair Arlington Zoning Board of Appeals 51 Grove Street Arlington, MA 02476

RE: Thorndike Place Wetland Delineation

Chairman Klein:

In response to comments provided by the Arlington Conservation Commission and BETA Group, BSC Group wetland scientists have conducted a site visit on October 15, 2020 to reevaluate the wetland delineation initially completed in January 2020. With the initial delineation completed in winter conditions, a few wetland flags were adjusted based on growing season conditions. The following information is included as attachments to this letter:

- Wetland Delineation Memorandum dated October 19, 2020
- MassDEP Bordering Vegetated Wetland Delineation Field Data Forms (5)
- Existing Environmental Resources Plan revised October 22, 2020

This information is also being transmitted electronically to the Conservation Commission and BETA Group. We also want to extend our offer to walk the site with BETA Group when the review the delineation. Please me call at 781-710-7280 or email me at jhession@bscgroup.com if you have any questions or require additional information.

Very truly yours,

BSC Group, Inc.

John Hession, P.E.

Director of Land Development

cc: zba@town.arlington.ma.us

Richard Vallarelli, ZBA Emily Sullivan, Conservation

Susan Chapnick, Conservation Commission

Jenny Raitt, Planning and Community Development

Marta Nover and Todd Undzis, BETA Stephanie Kiefer, Smolak & Vaughan

Gwen Noyes and Arthur Klipfel, Arlington Land Realty

Engineers

Environmental Scientists

Custom Software

Developers

Landscape

Architects

Planners

Surveyors

204 of 842





33 WALDO STREET, WORCESTER, MA 01608 - www.bscgroup.com TEL 508-792-4500 - 800-288-8123

To: John Hession, BSC Group, Inc. Date: October 19, 2020

From: Gillian Davies and Susan McArthur, BSC Group, Inc. Proj. No. 23407.00

Re: Wetland Delineation, Thorndike Place, Arlington, MA

INTRODUCTION

On January 15 and on October 15 2020, BSC Group, Inc. (BSC) conducted a field delineation of wetland resource areas regulated under the *Massachusetts Wetlands Protection Act* (*WPA*) and associated *regulations* (310 CMR 10.00 et al) and the Town of Arlington *Wetlands Protection Bylaw* (*Article 8*) (*Bylaw*) and associated *regulations* (*Sections 1 through 34*) dated June 4, 2015, at the Thorndike Place/Mugar Property located off of Dorothy and Parker Roads. This primarily forested property is located between Route 2, a single-family residential neighborhood, and a local park. Site topography is relatively flat. Trash piles and debris, as well as a homeless encampment occur on the property.

ENVIRONMENTAL RESOURCE AREA MAPPING

BSC reviewed existing mapping of environmental resources for the project site. The majority of the property is located within the FEMA 100-year floodplain and part of the site appears to be located within the floodway associated with the Little River (a Letter of Map Revision (LOMR) may be needed), as indicated on the attached Environmental Resources Map. NRCS soils maps (Web Soil Survey) indicate that Udorthents, wet substratum, Urban land, wet substratum, and Swansea muck occur on the site. According to the Massachusetts Natural Heritage and Endangered Species Program (NHESP) and the MassGIS data layer for the Massachusetts Natural Heritage Atlas, no areas of Estimated or Priority Habitat for Rare Wildlife or Certified or Potential Vernal Pools exist on the project site. BSC also reviewed the USGS topographic map.

WETLAND RESOURCE AREA FIELD DELINEATION

In addition to reviewing relevant resource area mapping for the project site, BSC conducted an initial wetland field delineation on January 15, 2020. This wetland delineation was conducted in accordance with the MA WPA regulations, the Massachusetts Department of Environmental Protection handbook on Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act (March 1995), the Bylaw regulations, the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0) (January 2012), and the Field Indicators for Identifying Hydric Soils in New England (May, 2018). BSC evaluated onsite vegetation to determine areas where 50% or more of the vegetation qualify as wetland species according to the above-mentioned regulatory documents and according to wetland indicator status as described in the State of Massachusetts 2016 Wetland Plant List (http://wetland-plants.usace.army.mil/nwpl_static/data/DOC/lists_2016/States/pdf/MA_2016v1.pdf). In accordance with the above-mentioned soils guidance documents, BSC examined soils to determine where hydric soils occur, by auguring or digging a soil pit to evaluate the top 20 inches of soil for soil texture, color, horizon thickness and depth, and presence/absence of redoximorphic features. BSC also observed the site for evidence of wetland hydrology. Due to winter conditions (lack of growing season hydrology, lack of full suite of vegetation) a decision was made to reevaluate the wetlands at the site during the growing season. Following the same methodology, the wetland delineation was re-evaluated on October 15, 2020 and a few of the wetland flags were readjusted to accommodate growing season conditions. Wetland flags C-10, C-15 through C-17, C-17A, were moved upgradient to include a pocket of spotted touch-me-not (Impatiens capensis), silver maple (Acer saccharinum), and green ash (Fraxinus pennsylvanica). In addition, wetland flag D-10 was removed and the wetland line was revised to connect D-9 to D-11 based on the presence of cinnamon fern and hydric soils. Wetland data sheets were also prepared (attached).

BSC marked the boundaries of four Bordering Vegetated Wetland (BVW) areas (Series A, B, C and D) with sequentially numbered pink surveyor's tape. Additionally, BSC reviewed conditions at two potential Isolated Vegetated Wetlands (IVW) (H and I Series) that had been identified and flagged during a previous delineation of the series of th

Rev. 2015-11-16 Page 1 of 2



MEMORANDUM

other IVWs (F and G Series) had also been identified during the previous wetland delineation. BSC did not observe a predominance of wetland vegetation in the previously identified IVW areas on January 15^{th} , 2020. The data plots performed on October 15, 2020 confirm this finding (attached). One isolated area just west of the previously flagged isolated Wetland I on the north side of the property did demonstrate hydric soils $(0 - 14^{\circ} 10 \text{YR} 2/2)$, then 14 - 20 10 YR 4/3 with high chroma redox and loamy sand texture), but was vegetated with predominantly upland species (multiflora rose (*Rosa multiflora*), Japanese knotweed (*Fallopia japonica*), and garlic mustard (*Alliaria petiolate*).

Overall, BVW boundaries flagged on January 15, 2020 and readjusted on October 15, 2020 are similar to the boundaries flagged when wetlands were delineated previously in 2009. In some areas, the 2009 delineation extends upgradient of the BSC delineation, and in some areas the BSC delineation extends upgradient of the 2009 delineation. As the BSC delineation is the most recent, and wetland conditions can shift over time, BSC is of the opinion that this most recent delineation most accurately reflects conditions as they exist in the present .

BVW Series A and D are predominantly forested areas. BVW Series B is primarily forested with an area of herbaceous cover (predominantly common reed [Phragmites australis]), and BVW Series C is largely herbaceous common reed, with some forested area. Throughout the site, wetlands include the following tree species: red maple (Acer rubrum), box elder (Acer negundo), American elm (Ulmus Americana), white pine (Pinus strobus), ash (Fraxinus sp.), American Sycamore (Plantanus occidentalis), and black willow (Salix nigra). Shrub and sapling species include silky dogwood (Swida amomum), and box elder saplings. Herbaceous species include common reed, cinnamon fern (Osmundastrum cinnamomeum), sensitive fern (Onoclea sensibilis), and goldenrod (Solidago sp.), and vines include poison ivy (Toxicodendron radicans), bittersweet (Celastrus sp.), greenbriar (Smilax sp.) and wild grape (Vitis sp.). In upland locations, tree species include red oak (Quercus rubra), white pine, cottonwood (Populus deltoides), box elder, and red maple. Shrubs and saplings include white pine, barberry (Berberis sp.), brambles (Rubus sp.), and multiflora rose. Herbaceous species include upland grasses and goldenrod (Solidago sp.), and vines include bittersweet, wild grape, and greenbriar, and poison ivy.

REGULATORY REVIEW

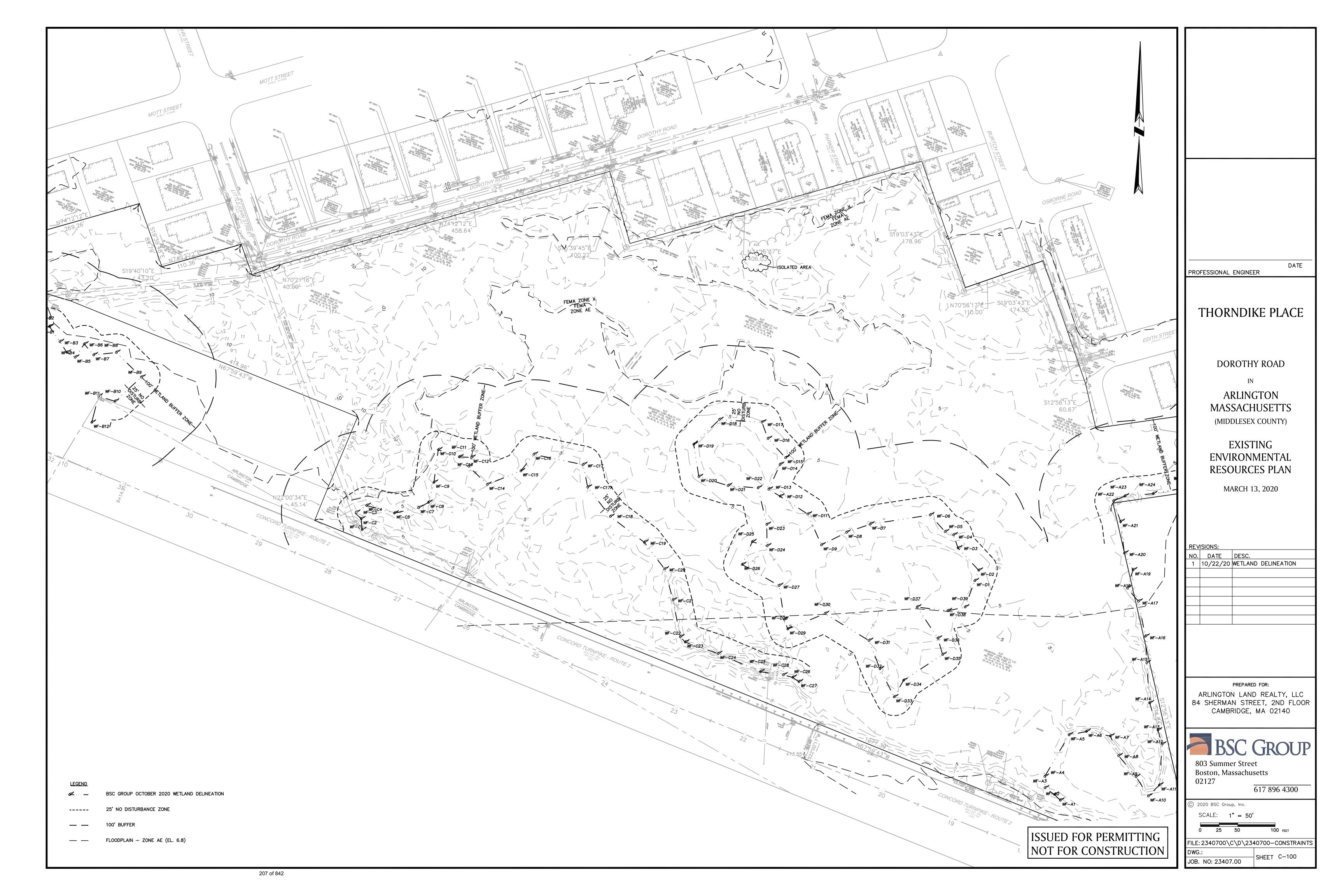
The project site contains state and locally regulated BVW and associated 100-foot buffer zones. BSC notes that the local *Bylaw regulations* identify the 100-foot buffer zone as a regulated resource area, the Adjacent Upland Resource Area (AURA). Further, the *Bylaw regulations* establish a 25-foot "No-Disturbance Zone" where no activities or work is permitted. The *Bylaw regulations* also establish a 75-foot "Restricted Zone" where impacts should be avoided and reasonable alternatives pursued.

The Bylaw regulations define Land Subject to Flooding (LSTF), as noted in *Bylaw Section 4.B. Definition number 35* and *Section 23*. Section 23 specifies that, "Compensatory flood storage shall be at a 2:1 ratio, minimum, for each unit volume of flood storage lost at each elevation.

SUMMARY

BSC has conducted a wetland delineation at the Thorndike Place/Mugar Property that is similar in extent to the previous delineation conducted in 2009. BSC notes that the site is largely within floodplain or floodway.

Marleigh Sullivan, BSC Group, Inc. Ethan Sneesby, BSC Group, Inc.



Applicant: <u>Thorndike Place</u>	Prepared by: BSC Group, Inc. (SMM & EPS)	Project location: Isolated Area, behind houses	DEP File #:
-----------------------------------	--	--	-------------

Check all that apply:

Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only

Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II

Method other than dominance test used (attach additional information)

Section I.

Vegetation	Observation Plot Num	ber: 1 (Wetland)	Transect Number: 1	Date of Delineation: 10/15/2020
A. Sample Layer & Plant Species	B. Percent Cover (or	C. Percent	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
(by common/scientific name)	basal Area)	Dominance		
<u>Trees</u>				
Ailanthus altissima / Tree of Heaven	63%	52%	Yes	NI
*Acer rubrum/ Red maple	38%	31%	Yes	FACW+
*Acer negundo/ Box elder	10.5%	9%	No	FAC+
*Ulmus rubra/ Slippery elm	10.5%	9%	No	FAC
Total Percent Cov	ver: 122%			
Shrubs/ Saplings				
	40.50/	4000/		540
*Acer negundo/ Box elder	10.5%	100%	Yes	FAC+
Total Percent Cov	or: 10 50/			
Herbaceous	rer. 10.5%			
Herbaceous				
Fallopia japonica/ Japanese knotweed	63%	86%	Yes	FACU-
Alliaria petiolata/ Garlic mustard	10.5%	14%	No	FACU-
7 mana penolata/ Same mastara	10.070	1470	140	17100
Total Percent Cov	ver: 73.5%			
Vines				
Celastrus orbiculatus/ Asian bittersweet	10.5%	50.00%	Yes	FACU
Vitis labrusca/ Fox grape	10.5%	50.00%	Yes	FACU
3. ap	. 5.5 / 5			

Total Percent Cover: 21%

Vegetation conclusion:

Number of dominant wetland indicator plants: 2 Number of dominant non-wetland indicator plants: 3 Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes no If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW-, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Section II. Indicators of Hydrology

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? yes no

title/date: WebSoil Survey/ 2020

map number: 655

soil type mapped: Udorthents, wet substratum

hydric soil inclusions: Yes

Are field observations consistent with soil survey? yes no Remarks:



Horizon Ap	Depth 0-14"	Matrix Color 10YR 2/1 (60%) 10YR 2/2 (40%)	Mottles Color - -	Texture Sandy loam
В	14"+	2.5YR 8/4 (90%) 10YR 7/8 (10%)		Sandy loam

Remarks: Area previously disturbed

3. Other:

Conclusion: Is soil hydric? yes no

Other Indicators of Hydrology: (check all that apply & describe)

Site Inundated:
Depth to free water in observation hole:
Depth to soil saturation in observation hole:
Water marks:
Drift lines:
Sediment Deposits:

	Drainage patterns in BVW:	
	Oxidized rhizospheres:	
	Water-stained leaves:	
٥	Recorded Data (streams, lake, or tidal gauge; aerial photo; of Other: _Buttressing of Ailanthus altissima	other):

Vegetation and Hydrology Conclusion								
	Yes	No						
Number of wetland indicator plants		X						
Wetland hydrology present:								
Hydric soil present	X							
Other indicators of hydrology present	X							
Sample location is in a BVW		X						
Submit this form with the Request for Determination of Applicability or Notice of Intent.								

Applicant: Thorndike Place Prepared by: BSC Group, Inc. (SMM & EPS) Project location: Isolated Area, behind houses DEP File #:__

Check all that apply:

Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only

Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II

Method other than dominance test used (attach additional information)

Section I.

Vegetation	Observation Plot Num	ber: 2 (Upland)	Transect Number: 1	Date of Delineation: 10/15/2020
A. Sample Layer & Plant Species	B. Percent Cover (or	C. Percent	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
(by common/scientific name)	basal Area)	Dominance		
			·	·
Trees				
*Acer negundo/ Box elder	85.5%	64%	Yes	FAC+
Ailanthus altissima/Tree of Heaven	38%	28%	No	NI
Quercus alba/ Northern white oak	10.5%	8%	No	FACU-
Total Percent	Cover: 134 %			
Shrubs/ Saplings				
*Acer negundo/ Box elder	63%	52%	Yes	FAC+
Rosa multiflora/Multiflora rose	38%	31%	No	FACU
*Ulmus rubra/ Slippery elm	20.5%	17%	No	FAC
	Cover: 121.5%			
<u>Herbaceous</u>				
Alliaria petiolate/ Garlic mustard	85.5%	100%	Yes	FACU-
T : 15	0. 05.50/			
Total Percent	Cover: 85.5%			

Vines Absent

Total Percent Cover: 0%

Vegetation conclusion:

Number of dominant wetland indicator plants: 2

Number of dominant non-wetland indicator plants: 1

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (ye) no



If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACW, FACW, FACW, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Section II. Indicators of Hydrology

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? yes no

title/date: WebSoil Survey/ 2020

map number: 655

soil type mapped: Udorthents, wet substratum

hydric soil inclusions: Yes

Are field observations consistent with soil survey? ves no Remarks:

2. Soil Description

Horizon	•	Matrix Color	Mottles Color	Texture
A	0-3"	10YR 2/2	-	Sandy loam
B	3-9"	10YR 3/3	_	Sandy Ioam

Remarks: Area previously disturbed

3. Other:

Conclusion: Is soil hydric? yes no



Other Indicators of Hydrology:	(check all that apply	& describe)
--------------------------------	-----------------------	-------------

Site Inundated:
Depth to free water in observation hole:
Depth to soil saturation in observation hole:
Water marks:
Drift lines:
Sediment Deposits:
Drainage patterns in BVW:

	Oxidized rhizospheres:
	Water-stained leaves:
<u> </u>	Recorded Data (streams, lake, or tidal gauge; aerial photo; other) Other: _

Vegetation and Hydrology Conclusion		
	Yes	No
Number of wetland indicator plants	Х	
Wetland hydrology present:		
Hydric soil present		Χ
Other indicators of hydrology present		Χ
Sample location is in a BVW		X no
Submit this form with the Request for Determination of Applicability or Notice of Intent.		

Applicant: Thorndike Place	Prepared by: BSC Group, Inc. (SMM & EPS)	Project location: Arlington- Near flag D-18	_DEP File #:
----------------------------	--	---	--------------

Check all that apply:

□ Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only

Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II

Method other than dominance test used (attach additional information)

Section I.

	Vegetation	Observation Plot Num	ber: 1 (Wetland)	Transect Number: 2	Date of Delineation: 10/15/2020
	A. Sample Layer & Plant Species	B. Percent Cover (or	C. Percent	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
	(by common/scientific name)	basal Area)	Dominance		
	<u>Trees</u>				
	*Acer negundo/Boxelder	20.5%	32%	Yes	FAC+
	*Acer saccharinum/ Silver maple	20.5%	32%	Yes	FACW
	Populus tremulas/ Quaking aspen	20.5%	32%	No	FACU
	Prunus serotina/Black cherry	3%	5%	No	FACU
Total Percent Cover: 64.5%					
	Shrubs/ Saplings				
	*Rhamnus frangula/ Glossy buckthorn	20.5%	55%	Yes	FAC
	*Acer saccharinum/ Silver maple	10.5%	28%	Yes	FACW
	*Fraxinus pennsylvanica/ Green ash	3%	8%	No	FACW
	Rubus strigosus/Common red raspberry	3%	8%	No	FAC-
	Total Percent Cov	er: 37%			
	<u>Herbaceous</u>				
	*Onoclea sensibilis/ Sensitive fern	85.5%	100%	Yes	FACW
	T- (-1 D (O	000/			
	Total Percent Cover: 89%				

Vines Absent

Total Percent Cover: 0%

Vegetation conclusion:

Number of dominant wetland indicator plants: 4

Number of dominant non-wetland indicator plants: 0

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (yes) no If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability of Notice of Intent

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW-, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Section II. Indicators of Hydrology

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? yes no

title/date: WebSoil Survey/ 2020

map number: 51A

soil type mapped: Swansea muck

hydric soil inclusions: Yes

Are field observations consistent with soil survey? ves no Remarks:

2. Soil Description

Horizon	Depth	Matrix Color	Mottles Color	Texture
Oe	0-0.5"			
Α	0-1"	10YR2/1	-	Mucky modified SL
Ae	1-4"	10YR 4/2	5YR3/4 (5%)	Mucky modified
			, ,	sandy loam
Bg	4-14"	2.5YR 6/3	7.5YR 4/6 (12%)	sandy loam

3. Other:

Conclusion: Is soil hydric? ves no

Other Indicators of Hydrology: (check all that apply & describe)

	Site Inundated:
	Depth to free water in observation hole:
	Depth to soil saturation in observation hole:
	Water marks:
	Drift lines:
П	Sediment Denosits:

Drainage patterns in BVW:
Oxidized rhizospheres:
Water-stained leaves:
Recorded Data (streams, lake, or tidal gauge; aerial photo; other) Other:

Vegetation and Hydrology Conclusion		
	Yes	No
Number of wetland indicator plants	X	
Wetland hydrology present:		
Hydric soil present	X	
Other indicators of hydrology present		X
Sample location is in a BVW	X	
Submit this form with the Request for Determination of Applicability or Notice of Intent.		

Applicant: Thorndike Place	Prepared by: BSC Group, Inc. (SMM & EPS)	Project location: Arlington- Near flag D-18	_DEP File #:
----------------------------	--	---	--------------

Check all that apply:

Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only

Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II

Method other than dominance test used (attach additional information)

Section I.

Vegetation	Observation Plot Number: 2 (Upland)		Transect Number: 2	Date of Delineation: 10/15/2020
A. Sample Layer & Plant Species	B. Percent Cover (or	C. Percent	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
(by common/scientific name)	basal Area)	Dominance		
<u>Trees</u> Prunus serotina/Black cherry Ailanthus altissima/Tree of Heaven Total Percent Cov	63% 20.5% rer: 83.5%	75% 25%	Yes No	FACU NI
Shrubs/ Saplings Rhus hirta/ Staghorn sumac Prunus serotina/ Black cherry Rubus strigosus/ Common red raspberry Total Percent Cov	20.5% 10.5% 10.5% ver: 41.5%	49% 25% 25%	Yes Yes No	NI FACU FAC-
Herbaceous Solidago canadensis/ Canada goldenrod Phytolacca americana/ American pokeweed Total Percent Cov	38% 20.5% rer: 58.8%	65% 35%	Yes No	FACU FACU+

Vines Absent

Total Percent Cover: 0%

Vegetation conclusion:

Number of dominant wetland indicator plants: 0

Number of dominant non-wetland indicator plants: 4

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes no If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW-, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Section II. Indicators of Hydrology

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? yes no title/date: WebSoil Survey/ 2020

map number: 51A

soil type mapped: Swansea muck

hydric soil inclusions: Yes

Are field observations consistent with soil survey? yes no Remarks:

ivernains.

2. Soil Description

Horizon	Depth	Matrix Color	Mottles Color	Texture
Α	0-1"	10YR 2/2		
Bw_1	1-6"	10YR 3/3	-	Sandy loam
Bw ₂	6-12+"	10YR 4/4	_	Sandy loam

Remarks:

3. Other:

Conclusion: Is soil hydric? yes no

Other Indicators of Hydrology: (check all that apply & describe)

	Site Inundated:
	Depth to free water in observation hole:
	Depth to soil saturation in observation hole:
	Water marks:
	Drift lines:
	Sediment Deposits:
	Drainage patterns in BVW:
П	Oxidized rhizospheres:

Water-stained leaves:
Recorded Data (streams, lake, or tidal gauge; aerial photo; other):
Other:

Vegetation and Hydrology Conclusion			
,	Yes	No	
Number of wetland indicator plants > # of non-wetland indicator plants		Χ	
<u>-</u>			
Wetland hydrology present:			
Hydric soil present		Χ	
Other indicators of hydrology present		X	
Sample location is in a BVW			
form with the Request for Determination of Applicability or Notice of Intent.			

Applicant: Thorndike Place Prepared by: BSC Group, Inc. (SMM & EPS) Project location: Arlington- Near flag C-14 DEP File #:_____

Check all that apply:

Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only

Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II

Method other than dominance test used (attach additional information)

Section I.

Vegetation	Observation Plot Num	ber: 1 (Wetland)	Transect Number: 3	Date of Delineation: 10/15/2020
A. Sample Layer & Plant Species	B. Percent Cover (or	C. Percent	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
(by common/scientific name)	basal Area)	Dominance	· ·	
<u>Trees</u>				
*Populus deltoides/Eastern cottonwood	20.5%	40%	Yes	FAC
Ailanthus altissima/Tree of Heaven	20.5%	40%	Yes	NI
*Fraxinus pennsylvanica/ Green ash	10.5%	20%	Yes	FACW
Total Percent Cov	er: 51.5 %			
Shrubs/ Saplings				
Rhus hirta/ Staghorn sumac	20.5%	60%	Yes	NI
*Populus deltoides/Eastern cottonwood	10.5%	31%	Yes	FAC
Rosa multiflora/Multiflora rose	3%	9%	No	FACU
Total Percent Cov	rer: 34%			
<u>Herbaceous</u>				
*Solidago patula/Rough stem goldenrod	38%	53%	Yes	OBL
Phytolacca americana/ American pokeweed	20.5%	28%	Yes	FACU+
*Rubus hispidus/Creeping dewberry	10.5%	15%	No	FACW
*Phragmites australis/ Common reed	3%	4%	No	FACW
Total Percent Cov	er: 72%			
\ ''				

Vines Absent

Total Percent Cover: 0%

Vegetation conclusion:

Number of dominant wetland indicator plants: 4

Number of dominant non-wetland indicator plants: 1

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes no If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent

^{*} Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FACH, FACW-, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Section II. Indicators of Hydrology

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? ves not title/date: WebSoil Survey/ 2020 map number: 655 soil type mapped: Udorthents, wet substratum

hydric soil inclusions: Yes

Are field observations consistent with soil survey? yes no Remarks:

2. Soil Description

Horizon Depth Matrix Color Mottles Color Texture
A 0-1" 10YR 2/1 - Sandy loam
Bc 1-14"+ 10YR 4/2 Depletion: Sandy loam
7.5YR 4/6 (12%)
10YR 6/2 (10%)

Remarks:

3. Other:

Conclusion: Is soil hydric? yes no

Other Indicators of Hydrology: (check all that apply & describe)

Site Inundated:	
Depth to free water in observation hole:	
Depth to soil saturation in observation hole:	
Water marks:	
Drift lines:	
Sediment Deposits:	
Drainage patterns in BVW: Present	

Oxidized rhizospheres:	
Water-stained leaves:	
Recorded Data (streams, lake, or tidal gauge; aerial photo; o	ther):

Vegetation and Hydrology Conclusion				
	Yes	No		
Number of wetland indicator plants	X			
Wetland hydrology present:				
Hydric soil present	Χ			
Other indicators of hydrology present	Χ			
Sample location is in a BVW	Х			
Submit this form with the Request for Determination of Applicability or Notice of Intent.				



To: Arlington Zoning Board of Appeals

Fr: Stephanie Kiefer, Smolak & Vaughan, LLP

Date: November 3, 2020

Re: Thorndike Place, ZBA Docket No.

STATEMENT OF DEMONSTRATION OF COMPLIANCE WITH ARLINGTON'S MASTER PLAN, HOUSING PRODUCTION PLAN, AND OPEN SPACE AND RECREATION PLAN

This memorandum is submitted on behalf of Arlington Land Realty, LLC ("ALR") in further support of its proposed Comprehensive Permit Application pending before the Board. Within ALR's Comprehensive Permit Application, an initial statement was provided regarding the Applicant's proposal and its consistency with sustainable development principles, including the Project's consistency with the Arlington Master Plan and Housing Production Plan. *See* Application, Sections I.C and IV.G. As indicated in our September 25, 2020 Supplemental Response to Completeness Review Memo and in light of the recent project design change, as presented to the Board at its October 13 public hearing, we are pleased to provide this update, identifying the relevant provisions within Arlington's Master Plan, Housing Production Plan and Open Space and Recreation Plan and demonstrating the Project's furtherance of such goals set out in these municipal plans.

CONSISTENCY WITH ARLINGTON'S MASTER PLAN

The 2015 Master Plan establishes a number of Key Findings, Recommendations and Goals under topical categories of land use, traffic and circulation, housing, natural resources and open space, public facilities and services. Notably, the Thorndike Place 40B project is responsive to the Town's recommendations and otherwise advances a number of the very goals that the Town has identified within the Master Plan.

I. <u>ALR's Thorndike Place 40B Notably Advances Salient Affordable Housing Key</u> Findings, Policies and Recommendations Described Within the Master Plan.

As described in the Master Plan, Key Finding 8 succinctly states although Arlington has had some success in creating affordable housing (limited to 140 units from 2000-2015), "despite efforts by the Town, the HCA and the Arlington Housing Authority (AHA), **Arlington has lost some of its traditional affordability**." [Master Plan, p.8]. According to the Town's website, as of 2018, the percentage of Arlington's Subsidized Housing Inventory ("SHI") remains stagnant at 5.6%, well below the state 10% statutory goal. According to DHCD records, as of 2020, Arlington has 1,122 SHI units. The municipal website states that in the nearly two decade period (2000-2018), Arlington has increased its percent of affordable housing by only .1%.

• Arlington Has Lost Some its Traditional Affordability [Finding 8, Master Plan, P.8]



The Master Plan points out the need for housing all demographics, including families, elderly and households with low and or moderate incomes. "The US Census Bureau estimates that 32% of all households in Arlington spend more than 30 percent of their gross income on housing... Moreover, half of Arlington's lower income homeowners are severely cost burdened, i.e., households that spend over 50 percent of their income on housing..." [Master Plan, p.84 (emphasis supplied)]. The Master Plan also documents that 44% of Arlington renters have low or moderate incomes and almost 80 percent are housing cost burdened." [Id. (emphasis supplied)]. Further, the Master Plan cautions that the rising housing costs in Arlington "make it more difficult to preserve the social mix that many people characterize as one of [Arlington's] strengths." [Master Plan., p.87].

In response to this serious deficit in affordable housing, the Thorndike Place 40B development will create 176 rental units available to families, individuals, seniors as well as individuals, including low or moderate income individuals, families and seniors. The creation of this multifamily housing project not only addresses the affordable housing need in Arlington, but it also provides greater housing choice to those individuals who either may be downsizing and/or unable to enter into the ownership housing market at this time. Moreover, 44 units at Thorndike Place will be set aside as permanently affordable to low and moderate income families. Because Thorndike Place is a 40B rental housing development, however, *all 176 units* will be counted towards Arlington's SHI unit count. The addition of 176 units will increase the amount of Arlington's SHI housing by close to one percent (i.e., approximately .85%). Upon certification of its Housing Production Plan, Arlington could then avail itself of a one year "safe harbor" under 760 CMR 56.03 for newly proposed 40B projects.

• The Master Plan Identifies the Mugar Site As One of Two Possible Vacant Parcels Available to Address the Municipal Housing Need. [Master Plan, p.87].

The Master Plan identifies "Issues and Opportunities" to address Arlington's affordable housing need. In particular, the Master Plan specifically notes that Arlington generally has a lack of vacant land available for new housing construction. [Master Plan, p.87]. The Master Plan identifies two possible undeveloped areas in the town as possible housing sites: a) the Mugar site and b) a 6.4 acre site abutting Poets' Corner. [Id.].¹

As to the Mugar site, the Master Plan implicitly recognizes that under the existing zoning designation (Planned Unit Development), the site is appropriate for housing, but notes that a large portion of the property is within the flood zone. [Master Plan, p.88].

In response, the Thorndike Place proposed project, as revised, is notably consistent with the Master Plan's recognition of the Mugar site as an affordable housing site "opportunity." In fact, since the Housing Appeal's Committee's favorable ruling on the GLAM challenge, which returned the ALR 40B project to the ZBA for review, the Applicant's engineers at BSC Group have fully surveyed the property and located the current FEMA floodplain as it exists on the site.

-

¹ As to Poets' Corner site, the Master Plan recognizes that its higher value may be for non-residential development given its highway proximity.



While a large floodplain area does exist on the 17+ acre site, the north/northwesterly portion of the site is completely outside of the floodplain. The large size of the Mugar site allows for both goals of the creation of affordable housing and the protection of floodplain to coexist.

The revised project design mindfully reduces the total building footprint by: a) eliminating the 6 townhouse buildings along Dorothy Road; and b) reducing the footprint of the multifamily building and shifting it to the north and west, predominantly outside the floodplain. As revised, the multifamily building presents very limited impact within the floodplain, i.e., limited portions of the easterly side of the building in two shallow fingers of floodplain. While the Master Plan has noted the lack of vacant parcels to create housing, and has expressly identified the Mugar land as one such parcel, Applicant's revised 40B project plan demonstrates the ability to both make productive use of this site for housing purposes and to otherwise leave the majority of the site undeveloped.

• Thorndike Place Advances Two of the Four Master Plan's Housing "Goals and Policies": (a) Creating Housing Variety for a Range of Incomes, Family Size and Needs and (b) Encouragement of Sustainable Construction.

The Master Plan identifies four "Goals and Policies" with respect to housing:

- 1) Encourage mixed use development that includes affordable housing;
- 2) Provide a variety of housing options for a range of incomes, ages, family sizes and needs;
- 3) Preserve the "streetcar suburb" character; and
- 4) Encourage sustainable construction/renovation of new and existing structures. [Master Plan. p.10].

In response, the Thorndike Place 40B project proposal advances two of the Master Plans' stated "Goals and Policies." The proposed project advances the municipal goal of providing a variety of housing options for various sectors of the population. Also, the proposed project will advance sustainable construction and development of the site, addressing multiple municipal goals of preserving valuable floodplain and responding to the long overdue need for affordable rental housing options in Arlington.

(i) The Thorndike Place Project Provides A Variety Of Housing Options For A Range Of Incomes, Ages, Family Sizes And Needs. [Master Plan, p.10].

Thorndike Place is proposed to consist of 176 rental units, consisting of a mix of studio, one-, two-, and three-bedroom units. The range of unit sizes will appeal to single adults, families as well as Arlington's aging population and/or empty nesters. The broad appeal of Thorndike Place is based not only on its full suite of unit sizes, but also its proximity to public transportation, to nearby shopping and to the Minuteman Bike Path and other outdoor recreation areas. The proximity to the Alewife MBTA Station allows for both working adults and retired adults an affordable housing option with nearby access to public transportation without undue reliance on automobiles. The Alewife Station serves the Red Line as well as a number of MBTA bus routes, including Route 62, Route 67, Route 76, Route 79, Route 84, Route 350 and Route



351. In addition, due to the proximity of the Minuteman Bike Path, the residents have multi-modal options, including walkable access, bicycles, subway and bus.

Consistent with 40B requirements, the Project will include 25% of the project (44 units) as available to low and moderate income residents. Because the development is a rental development, the Town will be able to include all 176 units as eligible SHI units. In practical terms, the increase in affordable housing units is greater than .5% of the total housing units and will allow the Town to have its HPP certified and to avail itself of a 40B "safe harbor" under 760 CMR 56.04(4)(f).

(ii) Thorndike Place Encourages/Utilizes Sustainable Construction Practices.

Consistent with the Master Plan's housing goal of encouraging sustainable construction, Thorndike Place promotes such a goal on multiple levels. First, Thorndike Place is sustainably planned and engineered. As stated previously, the majority of the 17+ acre site will remain open, undeveloped and will be restricted from development in the future by use of a conservation restriction or similar land conservation mechanism. Aside from the very important goal of increasing affordable housing stock and housing diversity in Arlington, the ability for the Town to secure a permanent protection for the majority of the Mugar site is significant.

Second, and with respect to the developed portion of the site, the Applicant has established a sustainable and low impact development. The revised project design keeps the amount of impervious surface largely limited to the building and the access drive and small surface parking area in the northwest corner. Further, the building construction will use modular GreenStaxx units. The modular design and building system reduces and/or repurposes construction waste, uses green materials and relies upon residential sustainable design standards (LEED) as the benchmark. Typical construction impacts are dramatically reduced through the use of the state-of-the-art modular system. Further, the proposed building proposes the use of blue roofs, i.e., water detention on the roof which decreases impacts in storm events and flooding risks. Rooftop water detention can also keep the building cooler in warmer months, reducing the need for air conditioning and thereby reducing electricity consumption.

• Thorndike Place Builds Upon the Master Plan's Housing Recommendations That "Arlington Plan for Affordable Housing." [Master Plan, pp. 13, 88].

Two of the Master Plan's "Key Recommendations" specifically address compliance with Chapter 40B and the need to increase affordable housing consistent with a Housing Production Plan. [Master Plan, Housing Recommendations 1 and 2, p.13]. Housing Recommendation 1 is to "create an affordable housing plan." [Id.]. Implicit in the creation of a housing plan, the municipality must effectuate the plan. As discussed below, Arlington had set a target of increasing affordable housing by roughly 100 units per year. Although in the years since its adoption, the Town has fallen far short of that goal, the Thorndike Place project notably advances the HPP's goal of creating affordable housing; giving the Town greater control to plan for future housing and allowing for the Town to reach a safe harbor milestone. Housing Recommendation 2 is that the Town allocate its resources to both meet local needs and the State's requirements under Chapter 40B. [Id.].



Page 88 of the Master Plan includes limited "recommendations" for the Town vis-a-via housing and residential development. The first of those recommendations is to "plan for affordable housing." Embedded within that recommendation of the 2015 Master Plan was for the Town to implement a Housing Production Plan ("HPP"). The following year, in late 2016, Arlington's HPP was approved by the DHCD. Notwithstanding the existence of the HPP, on a practical level, Arlington has made extremely limited progress in advancing the creation of affordable housing in the four years since the HPP was created and the Town remains well below the state threshold of 10% affordable housing. Arlington has only 5.6% affordable housing.

In response, the Thorndike Place project advances the Master Plan's recommendation that the Town plan for affordable housing, as it puts into effect the very goals of the HPP (discussed below). According to the DHCD's SHI inventory of Arlington's total 19,881 housing units, only 5.6% are SHI housing units. ALR's 40B project proposal will increase the number of SHI units by 176 units, which is more than the number of affordable units added by the town during the period from 2000-2014. Likewise, with 176 new SHI units, Arlington could seek certification of its HPP and upon such certification, avail itself of a one year "safe harbor" during which Arlington can focus upon other project sites it desires for inclusion of additional affordable housing.

• The Town Should Study and Plan for Increasing the Supply of Over-55 Active Senior Market Rate housing and Affordable/Subsidized Housing to Meet Arlington's Population Trends. [Master Plan, Housing Recommendation 5, p. 13].

In response, while Thorndike Place is not specifically targeted as an over-55 senior market rate housing and affordable housing development, the Project provides an attractive choice for the 55+ senior market, seeking either affordable housing and/or market rate housing. Thorndike Place provides a variety of unit sizes, studios, one-bedrooms, two-bedrooms and some three-bedrooms perfectly sized for empty-nesters and located within proximity to public transportation as well as an existing network of bike and walking paths (Minuteman Bike Path and Alewife Greenery Bike Path).

- II. Master Plan Goals For Land Use Include Encouraging Development That Enhances the Quality of Arlington's Natural Resources and Build Environment.

 [Master Plan, p.29].
 - "Wherever possible, Arlington should seek to direct new development to existing assets, near transit in order to reduce auto dependency and near existing services and infrastructure." [Master Plan, p.37].

In response, Thorndike Place is positioned to take advantage of existing assets, notably including the proximity to bus and subway service at nearby Alewife Station as well as the proximity to the Minuteman Bike Path. The ALR site is within .6 miles from the MBTA Alewife/Red Line Station. It is also within two-tenths of a mile from several fixed bus route stops (e.g. Bus lines #76, #62, #351, #67 and #84 and within four-tenths of a mile from bus stops



for the #77, #79 and #350 bus lines. Bus line #78 is one half mile from the Site). The site is uniquely located near the Town's existing bike path and near a number of public transportation options to reduce auto dependency. The site is likewise conveniently located less than a mile from nearby shopping, restaurants and services at Alewife as well as to outdoor recreation (Alewife Brook Reservation, Minuteman Bike Path, Thorndike Field).

In addition to the Project's ability to take advantage of the existing multimodal transportation network, the Developer has proposed a project which reduces the area of land development to a single multifamily building and would provide for permanent protection for over 11 acres of lands that have been identified as a priority for preservation. [Master Plan, p.44]. The 40B project strikes the appropriate balance of addressing the municipality's pressing need for affordable rental housing together with the desire to preserve those portions of the site it deems to be valuable from a natural resources perspective.

- III. Arlington Master Plan Recommendations for Natural Resources and Open Space Include Pursuit of Strategies to Preserve Open Space and Manage Floodplains.
 - The Town Should Continue Pursuit of Resolution of Mugar Land, Including Partial Development of the Land. [Master Plan, Natural Resources/Open Space Recommendation 3, p.144].

The Master Plan details limited efforts over the past 20 years to protect, at least in part, the ALR property. The private land, while a priority for the Town in terms of protection, has also been identified as viable undeveloped land for residential housing [Master Plan, p.87]. As a pragmatic approach, the Master Plan recommends specifically for the Mugar site that the Town should continue to pursue resolution of the land, "either for partial development or open space protection." [Master Plan, p. 144, Natural Resources and Open Space Recommendation 3].

In response, the Thorndike Place 40B project advances both of the alternate recommendations set out in the Master Plan. Specifically, upland portions of the site would be developed for the multifamily housing and the balance of the property (more than 11 acres) would be set aside as permanently protected open space. The thoughtful balance to achieve both the property owner's rights to make use of a portion of its land and the ability to permanently protect open space for which the Town has long-sought to protect creates a win-win scenario.

The Thorndike Place 40B Project proposal directly provides a viable strategy to allow the municipality the ability to ensure that open spaces are preserved and floodplains managed. The project is ideally located to allow the residents convenient access to the nearby Minuteman Bikeway as well as to the Alewife Brook Reservation, Thorndike Field and the Alewife MTBA Station, all of which are easily accessible by foot or bike. The proposed project also limits the project size and allows for the overwhelming majority of the site to be preserved as open space. As recommended by the Master Plan, the partial development of the site allows the property owner the ability to make use of its land while also preserving the more environmentally sensitive lands in perpetuity



• The Master Plan's Recommendation for Sustainable Planning and Engineering Approaches is Reflected in ALR's 40B Proposed Affordable Housing. [Master Plan, p. 144, Natural Resources and Open Space Recommendation 5]

In response, the revised project design for Thorndike Place is premised upon minimizing impact to natural resource areas, such as floodplain and wetlands buffer, and providing quality housing that relies upon a minimal development footprint. The proposed density of Thorndike Place is such that less than a third of the total land area will be developed and the remaining two-thirds can remain as protected open space. Aside from the very important goal of increasing affordable housing stock and housing diversity in Arlington, the ability for the Town to secure a permanent protection for the majority of the Mugar site is significant.

With respect to the developed portion of the site, the amount of impervious surface is largely limited to the building and the access drive and small surface parking area. Plantings to the rear of the developed portion of the site will be vegetated with native vegetation to provide an aesthetically pleasing transition to the wetland resource area and buffer thereto in the southern portion of the site. The building construction will use modular GreenStaxx units. The modular design and building system reduces and/or repurposes construction waste, uses green materials and relies upon residential sustainable design standards as the benchmark. Typical construction impacts are dramatically reduced through the use of the state-of-the art modular system. Further, the proposed building proposes the use of blue roofing, i.e., water detention on the roof which decreases impacts in storm events and flooding risks. Blue roof design can also keep the building cooler in warmer months, reducing the need for air conditioning and thereby reducing electricity consumption.

The Master Plan's Recommendation 7 for Natural Resources and Open Space Suggests the Town Consider Measures to Encourage Development Projects That Respect and Enhance Adjacent Open Space and Natural Areas. [Master Plan, p.145].

The Master Plan recognizes that recent development projects, such as the former Symmes hospital site, resulted in protection of woodlands and new public parks, demonstrating that economic development "can go hand in hand with natural resource protections." [Master Plan, p.145.]

In response, ALR's Thorndike Place similarly presents an ability for creation of affordable housing on a portion of the ALR site, with the balance of the site to be protected in perpetuity consistent with the recommendation of encouraging development that respects and enhances adjacent open spaces. Once again, the Master Plan recognizes that achievement of its multiple objectives are not exclusive of one another. The Thorndike Place proposal similarly is designed to achieve smart housing, that is transit-oriented, available to tenants of varying economic levels, ages and needs and to also provide the much-desired permanent protection on the majority of the ALR property. The Applicant's proposal advances the Town's recognized principle that development and natural resource protection can go hand in hand.



CONSISTENCY WITH ARLINGTON'S HOUSING PRODUCTION PLAN

In late 2016, the Town of Arlington received approval on its Housing Production Plan (HPP) from the Department of Housing and Community Development (DHCD), as effective October 6, 2016². Despite its adoption of the HPP, since 2016 the Town has not notably advanced affordable housing production in accordance with the HPP's announced objectives³.

As stated in Table 16 of the HPP, Arlington's Affordable Housing Production Goals involve an additional 100 SHI state-certified units for each year from 2016-2021. At the time of the adoption of the HPP, Arlington SHI inventory was 1,121 units (5.64%). As noted on the Town's website, the Town's affordable housing stock currently represents 5.6% of total housing units.

Within the HPP's comprehensive needs assessment, the Town found that:

- a) More than one out of every four households in Arlington (25%) have low incomes (Executive Summary, p.5⁴);
- b) Very few rental units on the market are available to lower income households (Executive Summary, p.6); and
- c) A need for updated housing as one out of every two homes in Arlington was constructed prior to 1939 (Executive Summary, p.6). As noted, such older homes lack heat and energy efficiency, may not be in compliance with current health, safety and building codes, and may otherwise contained lead based paint or other environmental hazards. Id.

Likewise, the need for apartment housing was also highlighted; in the period from 2000-2014, the Town of Arlington experienced approximately 1,460 rental unit conversions to condominiums, thereby depleting the supply of rental housing. <u>Id</u>.

Arlington's HPP sets out the very serious nature of its affordable housing need. Between the period of 1997 to 2016, the amount of affordable housing had only increased 1.21% (from 4.43% to 5.64%). The majority of the increase appears to have occurred between 1997 and 2000; according to the Town's website, in the period from 2000-2014, affordable housing only increased by .1%. Likewise, since the DHCD's approval of Arlington's HPP, there has been notably little progress in increasing the supply of affordable housing in Arlington.

-

² The HPP postdates the Applicant's Comprehensive Permit Application.

³ In fact, the Town may have decreased the number of affordable units since the time of ALR's 40B Application filed on September 1, 2016.

⁴ As described within the Affordable Housing "Key Findings", at Page 31 of the HPP, the percentage of low income households is even higher, noting that one-third of Arlington households are low income, with rates especially high among elderly unrelated households. The same "Key Findings" concludes that more than one-third of all households are "cost burdened," meaning that those households pay more than 30% of annual income toward housing.



The HPP identifies the following housing "priorities" over the five years (2016-2021):

- Expand housing supply the tight housing market/demand for housing results in increases in rents and sale prices, further adversely impacting low to moderate income persons. [HPP, p.56]. According to MAPC projections through 2020, several hundred additional units could be added to the housing supply to meet demand/prevent inflated sales/rental prices. *Id*.
- Diversify the housing supply The senior housing population is expected to grow, requiring housing that is in proximity to services, physically accessible and convenient to needs. [HPP . 56]. According to the HPP, while the number of affordable units is slightly over 1,000 units, there are more than 5,000 potentially eligible households, many of which are elderly. *Id.* Smaller households and senior households need smaller units so they are not over-housed, which in turn creates maintenance and cost challenges. *Id.* Also, more than one-third of Arlington households are cost burdened, indicating the need for more housing at multiple price points. *Id.*
- *Update Existing Housing Stock* one out of every two units were constructed prior to 1939. [HPP, p.56]. Of the rental housing, from 2000-2014, 1,460 rental units were converted to condominiums, resulting in a deficit of rental units and driving up of prices for rental units. *Id*.

In response, the Thorndike Place's Multifamily Housing proposal affirmatively addresses Arlington's prioritized needs as described within the HPP.

- a) Thorndike Place will expand housing supply: the total project is 176 units of which 25% (44 units) will remain in perpetuity for lease to low to moderate income households. As part of the 40B requirements, a fair housing and marketing plan will be in place and eligible tenants are required to confirm their income eligibility on an annual basis. The monitoring of affordability likewise addresses another issue described in the Master Plan, i.e., that there is "mismatch" in existing housing whereby persons with higher incomes are living in housing that is affordable to low and moderate income persons. Here, the programmatic controls required by a 40B project, ensure that the affordable units are inhabited by persons with the qualifying income (80% AMI).
- b) Thorndike Place will diversify the housing stock. Based on the findings of the HPP, there is a very real need for i) rental housing; ii) senior housing/empty nester housing; iii) transit-oriented housing. ALR's 40B project directly responds to each of these current shortcomings in Arlington housing supply. The proposed building is considered mid-rise (3-4 floors), and has elevator access, making it an ideal housing choice for older or mobility impaired residents. The older rental housing stock in Arlington largely prevents seniors from living in anything other than a ground floor unit. Also, while it is expected that the residents will rely on public transportation for most purposes, to the extent that residents will use cars, the majority of the parking is

_

⁵ Arlington's HPP notes that of its affordable housing units, 254 (slightly less than 20% of current affordable housing) could expire by 2059 (and some much sooner). HPP, p.65.



- in below-ground parking, which ensures that older residents can access their vehicles in winter months without walking distances across icy surfaces and /or have cars needlessly idling for long period to melt snow on windows.
- c) Unlike the older housing stock (which is stated to represent more than ½ of the housing), Thorndike Place will be constructed with weather-tight construction, energy efficient appliances and finishes, safe interior finishes (i.e., no asbestos), and with thoughtful amenities, such as internal bike parking, outdoor community grilling and terrace space, onsite management and a community room.

The Thorndike Place 40B project will advance not only the amount of affordable and market rate rental housing options in Arlington, by 176 units, but it will also provide Arlington with recent progress toward meeting its HPP's affordable housing goals and therefore allow it to avail itself of a safe harbor under Chapter 40B in the immediate future. While the Town has adopted an HPP, the Town has not over the past four (4) years advanced its goals and objectives. Because the Thorndike Project is a rental development, the entire unit count (176 units) will be counted as SHI units. Once certified by DHCD, the Town will be able to avail itself of the safe harbor under 40B.

HPP Goal 1 – Produce More, Diverse Housing to Address Documented Local Need. [HPP, p.57]

Response: With respect to certain goals set out in the HPP, the Town's first identified goal is for Arlington to "produce more, diverse housing for extremely-low to middle income households. The Table 16 affordable housing goals propose an annual increase of 100 units for each year until 2021. Within the HAC litigation, the Town reported only 1,061 SHI units in 2018, which would mean a decrease of affordable units from 2016. Assuming the Town's representations to have been correct, Arlington is well below its annual production goals. Under the HPP, Arlington should have 1,525 SHI housing units by 2020.

Unlike a series of small, two to four-unit rental projects, the Thorndike Place proposal not only would provide 176 eligible SHI units for the Town to make progress on the statutory 10% affordable housing goal, but it also directly provides for the type of diversity in housing that is sought by the Town. Thorndike Place presents an opportunity for seniors, smaller families, single-member households and low to moderate income as well as mixed income individuals and families to reside with close proximity to public transportation, services, amenities and to remain connected to other Arlington's neighborhoods via the bike path.

HPP Goal 3 – Integrate Affordable Units In a Broader Range of Housing Types Into the Fabric of Arlington's Existing Neighborhoods Through Redevelopment of Certain Underutilized Properties and Reuse of Existing Buildings. [HPP. p.58].

The HPP notes that mixed income development should not be confined to commercial centers, but should also be distributed throughout town to support socioeconomic diversity of Arlington's neighborhoods.



Response: Thorndike Place presents a unique opportunity to create such desired socioeconomic diversity in East Arlington, in a traditionally residential neighborhood. While the proposal does not seek to reuse existing buildings, ALR's proposal will breathe life into land that, while possessing some natural resource value, has been misused and underused over the years. By developing a portion of the site for a dynamic multifamily development, affordable units will be integrated into this neighborhood as well as the Thorndike Place community. As the number of affordable units (44) within the project will remain a constant, all units will be developed to the same standards and there is no artificial distinction between housing quality for the various socioeconomic residents. Similarly, the proposal to incorporate open space restrictions on the undeveloped areas of the property will cement the status of that portion of the property as protected open space.

HPP Goal 4 – Foster an Aging Supporting Community Via Housing Choices That Enable Older Adults to Thrive in Arlington as They Age.

Response: Thorndike Place provides Arlington's senior population a choice of living accommodations to be responsive to smaller household size. Given the proximity of public transport (subway and bus), services and amenities are easily accessible without reliance on driving. Long-term Arlington residents can remain members of the community, without staying in a home that has outgrown the seniors' living needs and/or income.

In summary, Arlington's HPP was intended to address the outstanding needs of the community concerning housing supply and demand, the lack of housing options for persons, especially those who are income burdened and the need to prevent a decline in Arlington's historic tradition of being a diverse community and open to all socioeconomic parts of society. Thorndike Place addresses those very needs and provides rental housing options that, to date, have been largely lacking in Arlington.

CONSISTENCY WITH ARLINGTON'S OPEN SPACE AND RECREATION PLAN (2015-2022)

Arlington's open spaces and recreational facilities are set out in the Open Space and Recreation Plan ("OSRP").[OSRP, p.72]. The OSRP recognizes that since 2007, the "most significant changes" in open space acreage since 2007 have arisen in relation to the protections on privately held lands: the former Symmes Hospital site and Elizabeth Island. *Id.* At Symmes, 8.5 acres of the 18-acre site are protected as park and/or woodland under conservation restrictions; the land is owned by the development company⁶.

While the Mugar Site is identified within the OSRP as an "Open Space and Recreational Facility," the property is not currently owned by the Town, nor does the Town hold any conservation restriction on the property. [See OSRP, p.72]. The OSRP also notes that the Town

⁶ Within that proposal, the developer obtained approval for 164 rental units and 12 condominiums (Arlington 360). Despite the number of allowable units, the Town only obtained 26 affordable units and less than half of the site was protected. The 2-acre Elizabeth Island is protected and owned by the Arlington Land Trust.



has not been able to identify a viable path to preserve any portion of the Mugar site, including a prior town vote to acquire the land. OSRP, p. 89].

THE THORNDIKE PLACE PROPOSAL ADVANCES OSRP GOALS. [OSRP, pp.122-123]

As stated within the OSRP's Goals and Objectives [OSRP, pp122-123], the first stated goal is to acquire ecologically valuable land or ensure protection through conservation restrictions or other means. ALR's 40B proposal includes protecting a portion of its lands via a conservation restriction or similar mechanism. The Town could achieve desired protection over the designated area without otherwise outright purchasing the land and instead, use municipal staff and funding resources to otherwise achieve OSRP goals and objectives.

The OSRP's third goal is to coordinate and strengthen local and regional planning and management of open spaces with various Town Departments. [OSRP, p.123]. Here too, the ZBA in working with ALR can forge a path to address Arlington's outstanding housing needs (affordable housing/diversity of housing choices/transit-oriented housing/low impact housing) while simultaneously advancing the Town's Open Space priorities. As noted, Arlington has sought a path for the protection of the floodplain and natural resources at the Mugar site for well over twenty years; the ALR 40B project responsibly identifies upland development and protection for the more sensitive areas of the site.

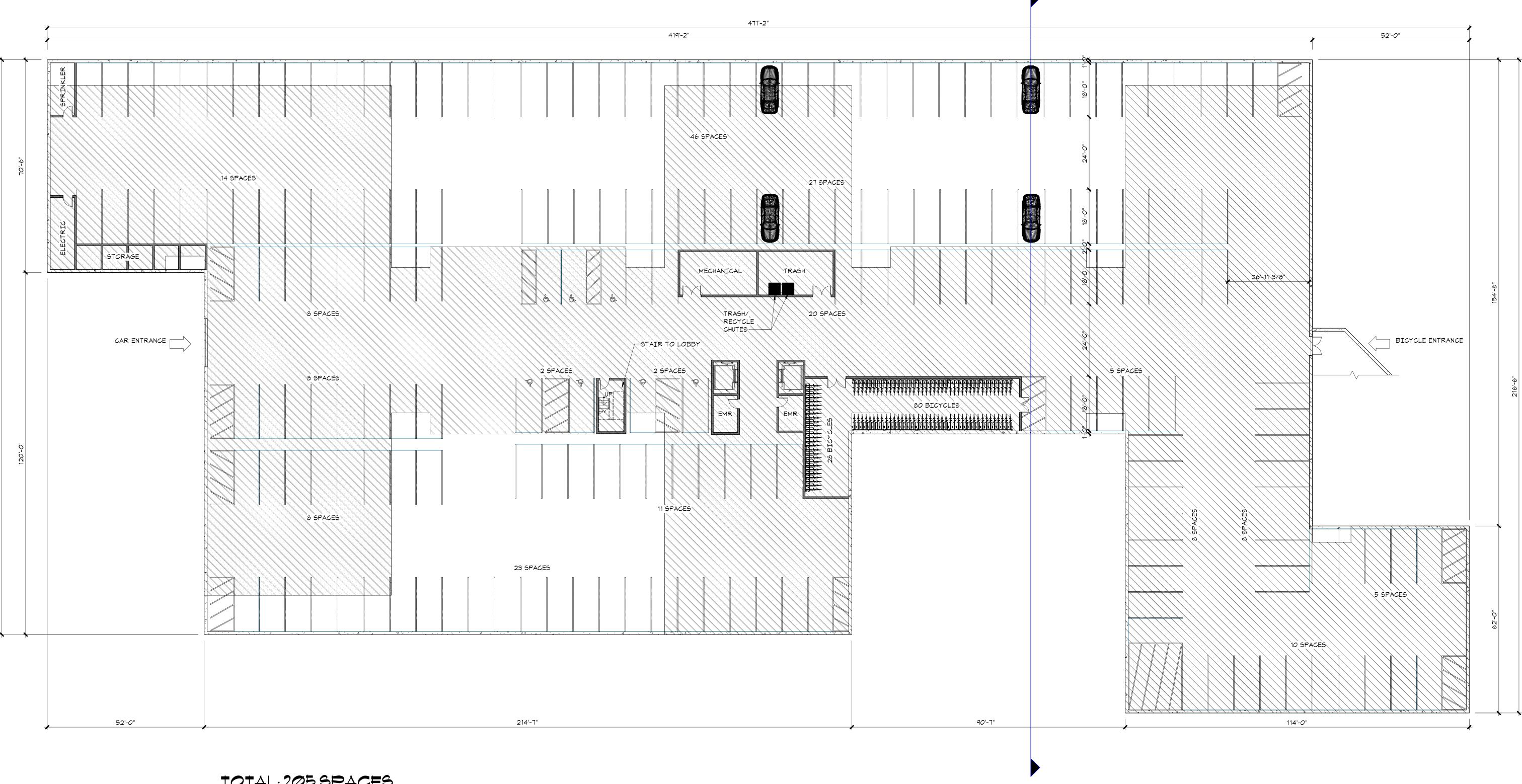
Response: ALR's Thorndike Place proposal provides a path to advance Arlington's desire to formalize protection on the majority of the site to ensure that the vast majority of wetland resource areas and floodplain on the site remain protected open space. Not only would such protections ensure that no future development on the protected lands occur, but it would also allow the Town to serve as a steward of such restricted area.

THE THORNDIKE PLACE PROPOSAL IS CONSISTENT WITH THE OSRP ACTION PLAN/OPEN SPACE AND RECREATIONAL PRIORITIES. [OSRP, pp.124-225].

The OSRP prioritizes protection of ecologically valuable land "such as the Mugar property... that could be lost as open space." [OSRP, p.124].

Response: While the Mugar property is casually referenced as ecologically valuable land, the real context is that the floodplain and wetland resource areas are desired for protection. The upland portions of the site, to the north and northwest of the site are not floodplain and instead are currently overgrown areas tucked adjacent to a densely developed residential area. That portion of the Mugar site to the north and northwest can be developed, as proposed by Applicant, to blend into the residential neighborhood. The majority of the site, to the east and southeast, abutting Route 2, can properly be protected. The Applicant, the Town and its community can work together toward a path to steward the undeveloped lands, as such stewardship models may exist with other protected areas, such as the private lands at the former Symmes Hospital.





TOTAL: 205 SPACES GARAGE: 72,428 SF

> GARAGEPLAN 0 4' 8' 16'

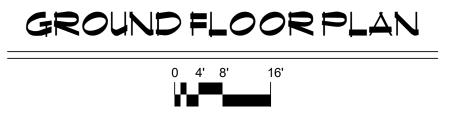


ARLINGTON, MA. 11/3/20

ARCHITECTURE LAND PLANNING INTERIOR DESIGN 3D VISUALIZATION

BRUCE RONAYNE HAMILTON ARCHITECTS

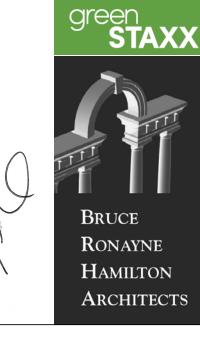


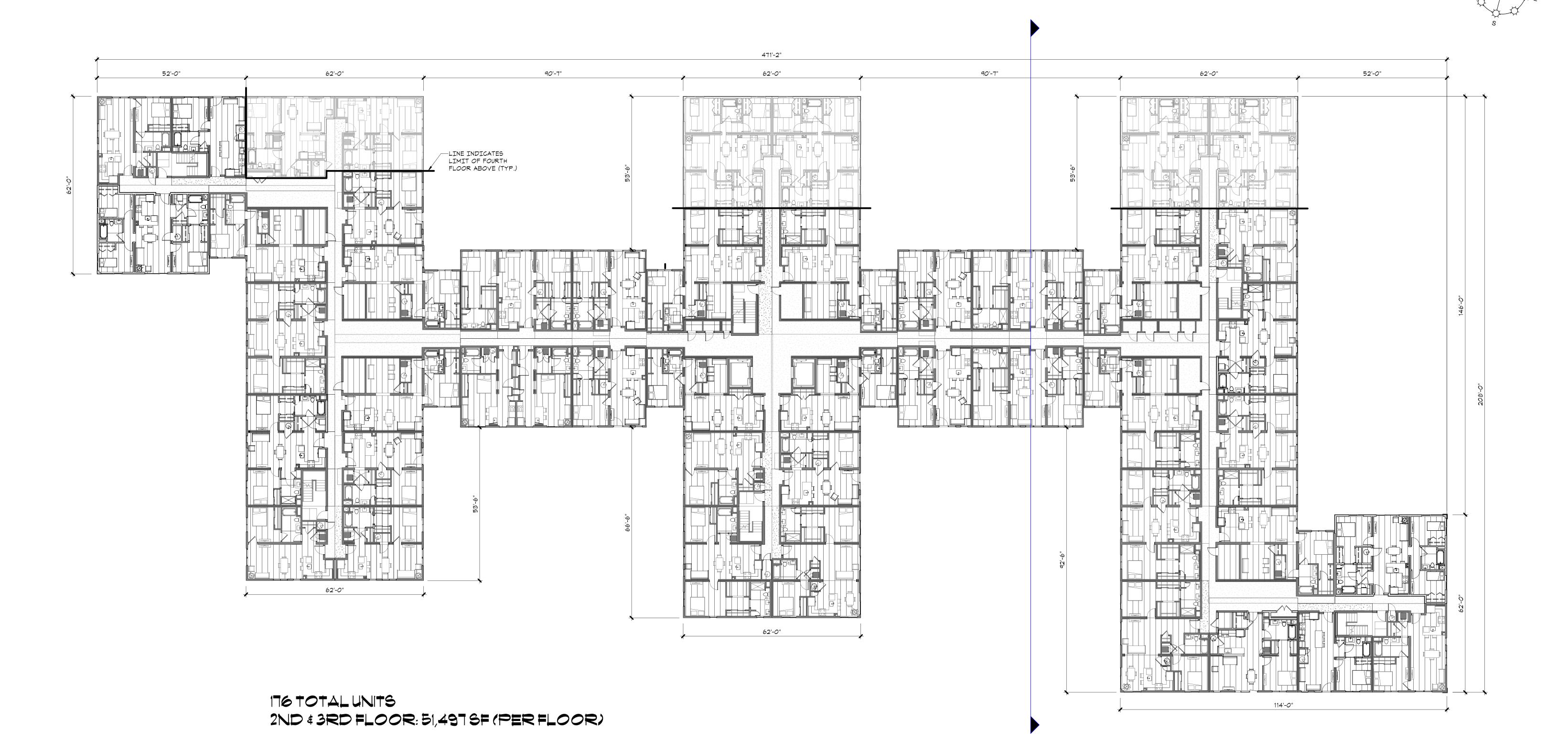


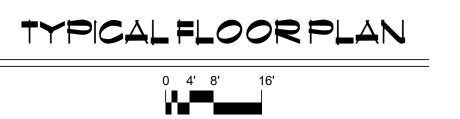


11/3/20

ARCHITECTURE LAND PLANNING
INTERIOR DESIGN
3D VISUALIZATION



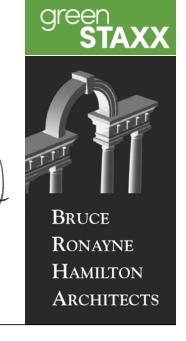


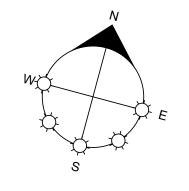




ARLINGTON, MA. 11/3/20

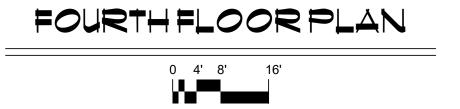
ARCHITECTURE LAND PLANNING INTERIOR DESIGN 3D VISUALIZATION







176 TOTAL UNITS FOURTH FLOOR: 45,076 SF



THORNDIKE APARTMENTS

ARLINGTON, MA. 11/3/20

ARCHITECTURE LAND PLANNING INTERIOR DESIGN 3D VISUALIZATION

RE BOSTON, BOSTON, MASS NO. 3392 NO. 33

BRUCE
RONAYNE
HAMILTON
ARCHITECTS

green **STAXX**



WEST ELEVATION

T.O. ROOF 44' - 2" THIRD FLOOR 22' - 1" SECOND FLOOR 11' - 0 1/2" FIRST FLOOR T.O. GARAGE SLAB -11' - 0"

EAST / WEST ELEVATION

0 2' 4' 8'

MATERIAL LEGEND

- CEMENTITIOUS HORIZONTAL SIDING, COLOR BY ARCHITECT
- B1 CEMENTITIOUS PANEL ACCENT SIDING, COLOR BY ARCHITECT
- B2 CEMENTITIOUS PANEL ACCENT SIDING, COLOR BY ARCHITECT
- B3 HORIZONTAL ACCENT SIDING, COLOR BY ARCH
- B4 PANEL JOINT
- C COMPOSITE TRIMS, COLOR BY ARCHITECT

- D INSULATED WINDOW & DOOR UNIT, WITH OPERABLE PANELS AS INDICATED
- JULIET BALCONY
- CONCRETE FOUNDATION WALL M/ PARGE COATING STUCCO FINISH, COLOR BY ARCHITECT
- G VERTICAL BATTEN SIDING
- H AMNING WITH CABLE ROD SUPPORTS
- ENTRANCE DOORS
- K OVERHEAD DOOR

EASTELEVATION 1/8" = 1'-0"

NOTE: BUILDING CONSTRUCTION TYPE

1-STORY UNDERGROUND PARKING

PER IBC 2015, SECTION 510.2 "HORIZONTAL BUILDING SEPARATION ALLOWABLE", A BUILDING OF USE TYPE S-1(PARKING GARAGE PER) AND TYPE 1A CONSTRUCTION AND PROTECTED THROUGHOUT BY AN AUTOMATIC SPRINKLER SYSTEM AND SEPARATED FROM CONSTRUCTION ABOVE BY A HORIZONTAL ASSEMBLY WITH A 3 HOUR FIRE RESISTANCE RATING IS ALLOWED TO BE CONSIDERED A SEPARATE BUILDING.

4-STORY RESIDENTIAL APARTMENTS

PER IBC 2015, TABLE 504.4 "ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE", A BUILDING OF USE TYPE R-2 AND TYPE 5A CONSTRUCTION AND PROTECTED THROUGHOUT BY AN AUTOMATIC SPRINKLER SYSTEM IS ALLOWED TO BE 4 STORIES. PER TABLE 504.4 "ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE", A BUILDING OF USE TYPE R-2 AND TYPE 5A CONSTRUCTION AND PROTECTED THROUGHOUT BY AN AUTOMATIC SPRINKLER SYSTEM IS ALLOWED TO BE 4 STORIES.

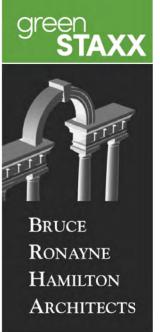
THORNDIKE APARTMENTS

ARLINGTON, MA.

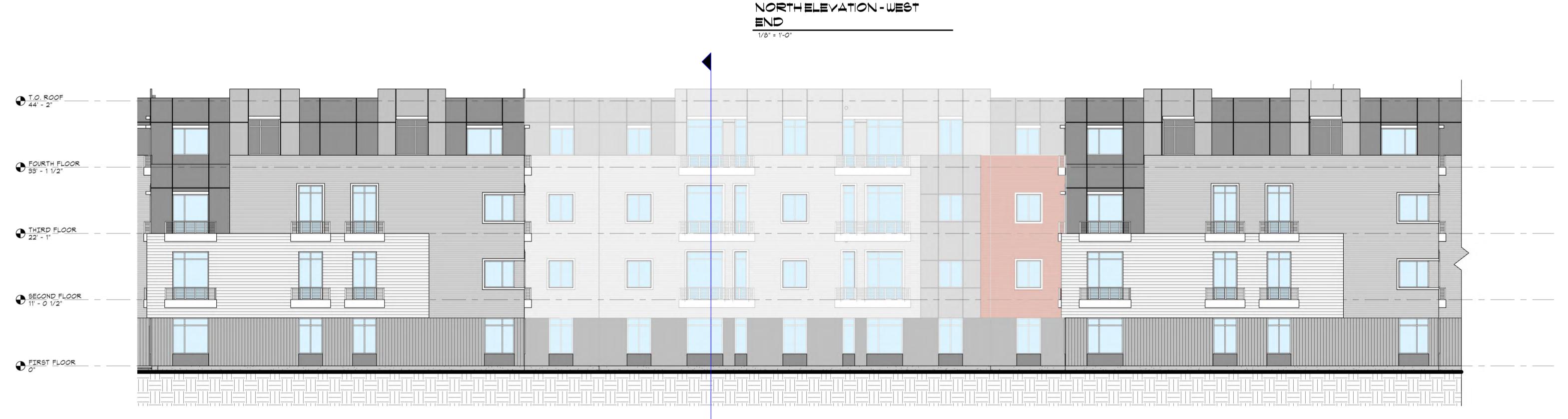
11/3/20

ARCHITECTURE LAND PLANNING INTERIOR DESIGN

3D VISUALIZATION







END

1/8" = 1'-0"

MATERIAL LEGEND

- A CEMENTITIOUS HORIZONTAL SIDING, COLOR BY ARCHITECT
- B1 CEMENTITIOUS PANEL ACCENT SIDING, COLOR BY ARCHITECT
- B2 CEMENTITIOUS PANEL ACCENT SIDING, COLOR BY ARCHITECT
- B3 HORIZONTAL ACCENT SIDING, COLOR BY ARCH
- B4 PANEL JOINT
- C COMPOSITE TRIMS, COLOR BY ARCHITECT

- D INSULATED WINDOW & DOOR UNIT, WITH OPERABLE PANELS AS INDICATED
- E JULIET BALCONY
- F CONCRETE FOUNDATION WALL M/ PARGE COATING STUCCO FINISH, COLOR BY ARCHITECT
- G VERTICAL BATTEN SIDING
- H AMNING WITH CABLE ROD SUPPORTS
- J ENTRANCE DOORS
- K OVERHEAD DOOR

NORTHELEVATION 0 4' 8' 16'

NORTHELEVATION - EAST

NOTE: BUILDING CONSTRUCTION TYPE

1-STORY UNDERGROUND PARKING

PER IBC 2015, SECTION 510.2 "HORIZONTAL BUILDING SEPARATION ALLOWABLE", A BUILDING OF USE TYPE S-1(PARKING GARAGE PER) AND TYPE 1A CONSTRUCTION AND PROTECTED THROUGHOUT BY AN AUTOMATIC SPRINKLER SYSTEM AND SEPARATED FROM CONSTRUCTION ABOVE BY A HORIZONTAL ASSEMBLY WITH A 3 HOUR FIRE RESISTANCE RATING IS ALLOWED TO BE CONSIDERED A SEPARATE BUILDING.

4-STORY RESIDENTIAL APARTMENTS

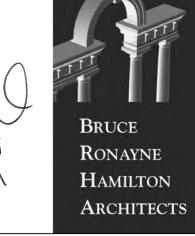
PER IBC 2015, TABLE 504.4 "ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE", A BUILDING OF USE TYPE R-2 AND TYPE 5A CONSTRUCTION AND PROTECTED THROUGHOUT BY AN AUTOMATIC SPRINKLER SYSTEM IS ALLOWED TO BE 4 STORIES. PER TABLE 504.4 "ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE", A BUILDING OF USE TYPE R-2 AND TYPE 5A CONSTRUCTION AND PROTECTED THROUGHOUT BY AN AUTOMATIC SPRINKLER SYSTEM IS ALLOWED TO BE 4 STORIES.

THORNDIKE APARTMENTS

ARLINGTON, MA.

11/3/20

ARCHITECTURE LAND PLANNING INTERIOR DESIGN 3D VISUALIZATION



green STAXX

833 TURNPIKE ROAD P.O. BOX 104





MATERIAL LEGEND

- A CEMENTITIOUS HORIZONTAL SIDING, COLOR BY ARCHITECT
- B1 CEMENTITIOUS PANEL ACCENT SIDING, COLOR BY ARCHITECT
- B2 CEMENTITIOUS PANEL ACCENT SIDING, COLOR BY ARCHITECT
- B3 HORIZONTAL ACCENT SIDING, COLOR BY ARCH
- B4 PANEL JOIN
- C COMPOSITE TRIMS, COLOR BY ARCHITECT

- D INSULATED WINDOW & DOOR UNIT, WITH OPERABLE PANELS AS INDICATED
- E JULIET BALCONY
- F CONCRETE FOUNDATION WALL W/ PARGE COATING STUCCO FINISH, COLOR BY ARCHITECT
- DING, G VERTICAL BATTEN SIDING
 - H AMNING WITH CABLE ROD SUPPORTS
 - J ENTRANCE DOORS
 - K OVERHEAD DOOR

SOUTH ELEVATION - WEST END

SOUTHELEVATION

0 2' 4' 8'

1/8" = 1'-0"

NOTE: BUILDING CONSTRUCTION TYPE

1-STORY UNDERGROUND PARKING

PER IBC 2015, SECTION 510.2 "HORIZONTAL BUILDING SEPARATION ALLOWABLE", A BUILDING OF USE TYPE S-1(PARKING GARAGE PER) AND TYPE 1A CONSTRUCTION AND PROTECTED THROUGHOUT BY AN AUTOMATIC SPRINKLER SYSTEM AND SEPARATED FROM CONSTRUCTION ABOVE BY A HORIZONTAL ASSEMBLY WITH A 3 HOUR FIRE RESISTANCE RATING IS ALLOWED TO BE CONSIDERED A SEPARATE BUILDING.

4-STORY RESIDENTIAL APARTMENTS

PER IBC 2015, TABLE 504.4 "ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE", A BUILDING OF USE TYPE R-2 AND TYPE 5A CONSTRUCTION AND PROTECTED THROUGHOUT BY AN AUTOMATIC SPRINKLER SYSTEM IS ALLOWED TO BE 4 STORIES.

PER TABLE 504.4 "ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE", A BUILDING OF USE TYPE R-2 AND TYPE 5A CONSTRUCTION AND PROTECTED THROUGHOUT BY AN AUTOMATIC SPRINKLER SYSTEM IS ALLOWED TO BE 4 STORIES.

THORNDIKE APARTMENTS

ARLINGTON, MA.

11/3/20

ARCHITECTURE
LAND PLANNING
INTERIOR DESIGN
3D VISUALIZATION



T.O. GARAGE SLAB -11' - 0"



SCHEMATIC BUILDING SECTION





ARLINGTON, MA. 11/3/20

ARCHITECTURE LAND PLANNING

INTERIOR DESIGN 3D VISUALIZATION





November 20, 2020

Jenny Raitt, Director, Department of Planning and Community Development Arlington Town Counsel 50 Pleasant Street Arlington, MA 02476

Re: Thorndike Place - Arlington, MA

Comprehensive Permit Civil / Site Peer Review #2

Dear Ms. Raitt:

BETA Group, Inc. (BETA) has completed its second peer review of the environmental, civil and stormwater related elements of the site plans and supporting engineering documents for the above-referenced project, based on the following materials:

- Thorndike Place Comprehensive Permit stamped plan set, Dorothy Road, Arlington MA, 12 sheets, dated March 13, 2020, revised November 3, 2020 prepared by BCS Group;
- Thorndike Place Stormwater Report, Dorothy Road, Arlington MA, dated November 2020 prepared by BCS Group;
- Notice of Eligibility for 40B Site Eligibility Letter, "Thorndike Place" off Dorothy Road, (Mugar Site)
 Arlington, MA, peer review letter prepared by Nover-Armstrong Associates, dated August 10, 2015;
- Report on Existing Conditions (Section 3.2.6 of Arlington Comprehensive Permit Regulations), dated November 3, 2020 prepared by Smolak & Vaughan, LLP;
- Architectural Drawings, dated November 3, 2020;
- Wildlife Habitat and Vegetation Evaluation;
- Updated waiver request list;
- Statement of Compliance with Arlington's Master Plan, Housing Production Plan, and Open Space and Recreation Plan; and
- Wetland Delineation Memorandum and Wetland Delineation Field Data Forms, October 19, 2020;
- FEMA Flood Insurance Study, Middlesex County, Revised June 6, 2016;
- City of Cambridge Floodviewer v2.1
- Town of Arlington Zoning Bylaw with amendments through April 2016;
- Town of Arlington Wetland Protection Bylaw, Article 8 and Regulations for Wetland Protection, June 4, 2015;
- MassDEP Stormwater Management Standards (SMS);
- Massachusetts GIS mapping tool OLIVER (http://maps.massgis.state.ma.us/map_ol/oliver.php), website visited July 20, 2020;
- USFWS Information for Planning and Consultation (IPaC), online tool (https://ecos.fws.gov/ipac/), website visited July 20, 2020.

Jenny Raitt, Director, Dept of Planning and Community Development November 20, 2020 Page 2 of 8

GENERAL

BETA Group was retained to perform a civil / site / stormwater design and traffic impact study peer review of the Comprehensive Permit application for the proposed Thorndike Place 40B housing project. Part of this review includes an overall analysis of the existing site to confirm its suitability for the proposed project. Stormwater calculations have been provided and proposed utilities are shown on the site plans. BETA's review of the Applicant's Traffic Impact Study is currently being conducted and those findings and recommendations will be provided in a separate comment letter.

BETA conducted a detailed site evaluation on November 12, 2020 to verify the data provided in the supplemental materials provided by BSC. The visit included confirmation of wetland boundaries, previously identified isolated wetland areas, review of general wildlife and vegetative habitat, and examination of the site for evidence of potential wetland conditions underlaying fill material.

EXISTING CONDITIONS

The project site includes multiple parcels that total approximately 17.7-acres of land located between Dorothy Road, Burch Street, and the Concord Turnpike (Route 2) in Arlington, Mass. Dorothy Road and Burch Street are both residential neighborhood streets featuring predominantly single-family houses. The site is essentially undeveloped woodland area that has been a location for the dumping of earthen fill and assorted debris throughout the years. Site topography generally slopes southerly towards the Concord Turnpike.

A review of the current FEMA Flood Insurance Study for Middlesex County indicates that a majority of the site is located within the mapped 100-year flood plain Zone AE (Elev. 6.8) and that almost all of the site is located within the 500-year flood plain Zone X.

PROPOSED PROJECT

The proposed project includes the construction of a multi-unit 4-story residential apartment building along with associated access driveways, parking areas, utilities, infrastructure, and stormwater management system.

2015 Comprehensive Permit Application

A Comprehensive Permit Application was originally submitted for the proposed Thorndike Place project by the Applicant in 2015. Nover-Armstrong Associates (N-A) conducted a detailed peer review of the application package and issued a peer review letter dated August 10, 2015. Their review letter contained eighteen (18) comments regarding the site plans and application package. The following comments from the 2015 N-A review letter related to civil/site design remain applicable:

- 15. Eight boring locations are shown on the Existing Conditions Plan C-1 with surface elevations and depths to groundwater noted. Dated and detailed boring logs are not provided on the plans or in the Application making it difficult to evaluate whether the depth of the groundwater observed represents the seasonal high groundwater elevation. The depth to groundwater is presumed to have been measured the day the borings were advanced and may not represent the actual high ground water elevation.
- 16. Excavated test holes witnessed by a MassDEP Soil Evaluator are necessary to definitively identify the Site's soil types and whether the conceptual project design is generally appropriate for the Site.



Jenny Raitt, Director, Dept of Planning and Community Development November 20, 2020 Page 3 of 8

Boring logs document encountered type soils on the Project Site which help evaluate what types of BMPs would be feasible for the stormwater management system.

Recommendation: The results of any soil borings or test pits done on the project site should be submitted for review. Determination of the seasonal high groundwater elevation is necessary to confirm that the proposed stormwater BMPs are suitable as shown.

2020 Comprehensive Permit Application

The following are new comments based on our review of the revised Comprehensive Permit submittal from November 2020:

SITE PLANS

- The proposed erosion control barrier is shown on the Site Preparation plan only.
 Recommendation: The applicant should also show the erosion control barrier on the Layout, Grading and Utility Plans.
- 2. A 15-ft wide pervious paver emergency access drive is shown looping around the rear of the main site building.
 - Recommendation: The Applicant should confirm that the access drive can accommodate an emergency vehicle (fire truck) turning around the southeast corner of the site building.
- 3. Existing Conditions Plan The applicant should add a professional surveyor's stamp.
- 4. General The applicant proposes to provide stormwater detention/retention on the building roof. The applicant should provide design plans/calcs of the proposed building roof (when developed) for review by an architect and/or structural engineer.
- 5. The applicant proposed a subsurface "Stormtrap" infiltration chamber system on the west side of the project site. The proposed system is located directly on top of an existing 14-inch sewer line. This presents a potential issue regarding accessing the existing sewer line for future maintenance or repair requirements.
 - Recommendation: The Applicant should confirm with the Arlington Public Works and/or Sewer Department that the proposed location of the infiltration system is acceptable.
- 6. Grading and Drainage Plan The proposed 15-inch drainpipe from OCS-1 to FES-1 has minimal cover. Recommendation: The applicant should revise the proposed grading in this area to provide adequate cover over the proposed drain.
- 7. Grading and Drainage Plan The applicant proposes an entrance door to the garage level on the east side of the building, the proposed finished grade elevation is 2.83. The seasonal high groundwater elevation of the site development area is presumed to be around elev. 3.0 based on past soil borings. Recommendation: The applicant should confirm the seasonal high groundwater elevation in this area and provide appropriate mitigative measures if necessary, to prevent surface water from entering the garage through the doorway.



Jenny Raitt, Director, Dept of Planning and Community Development November 20, 2020 Page 4 of 8

- 8. Areas for trash collection and snow storage are not identified on the site plan.

 Recommendation: The Applicant should identify potential areas for trash collection and snow storage on the site plan to confirm that these will not conflict with other site elements.
- 9. Civil and Landscape Details (sheet 1) The applicant has provided a Silt fence with Haybales erosion control barrier detail.
 - Recommendation: The applicant should utilize an 18-inch diameter compost-filled silt sock with silt fence in lieu of staked haybales for erosion control measures.
- 10. The applicant should provide a detail of the proposed Outlet Control Structures #1 and #2. Also, the applicant should review OCS-2 as it appears that the structure is too shallow to be constructed as shown.
- 11. Recommend the applicant adjust the location of the proposed pedestrian ramp on the west side of the site building so that it is located within the proposed crosswalk crossing the site access drive.
- 12. Recommend the applicant confirm that any footing of the proposed retaining wall near the driveway garage entrance will not conflict with the existing drainage pipe located in the same area.

FLOOD PLAIN

13. A portion of the proposed project design requires filling within the 100-year flood plain. Compensatory storage is required on a 1:1 (per foot) basis by the Mass Wetlands Protection Act (310 CMR 10.57) and on a 2:1 basis by the Arlington Wetlands Bylaw.

The applicant has provided compensatory flood plain storage calculations in the stormwater report (Sec. 2.12) and has designated an upland area on the site plan southeast of the proposed building for compensatory storage. In addition, the southeast courtyard area is labeled "Open Space / Flood Storage".

Recommendation: The Applicant should provide a plan graphic showing the existing flood plain area being altered by the proposed building / site development, currently the building hatch is obscuring the flood plain limits. The proposed compensatory flood storage volume calculations and designated flood storage volume area appear consistent.

STORMWATER MANAGEMENT

- 14. The Applicant should provide onsite soil exploration / test pit data for review, specifically within the footprints of the two proposed subsurface infiltration chamber systems. The test pit data is required at a minimum to determine the seasonal high groundwater elevations within the project limits.
- 15. The proposed site building roof will be designed to provide stormwater detention, with a roof drain connection to the proposed subsurface infiltration chamber system #1 located west of the building. The HydroCAD model included with the Stormwater Report shows zero runoff leaving the roof area for all storms up to and including the 100-year design storm. Discussions with the applicant indicate the disposition of this retained stormwater has not yet been finalized. Until the disposition of the retained rooftop stormwater is known, its effects on the proposed stormwater BMPs cannot be evaluated.



Jenny Raitt, Director, Dept of Planning and Community Development November 20, 2020 Page 5 of 8

- 16. The proposed infiltration chamber system #1 receives stormwater from a proposed CB located between the site access drive and proposed parking area west of the site building. The rim elevation of this CB is 8.0. The results of the HydroCAD model indicate that the 50-yr flood elevation within the infiltration system is elev. 8.28. This flood elevation will cause stormwater to surcharge out of the CB grate and overflow down the access driveway to the lower garage level.

 Recommendation: The Applicant should reevaluate the proposed infiltration chamber system #1 to provide adequate stormwater capacity so that there is no onsite surface surcharge for any of the proposed design storms.
- 17. The proposed infiltration chamber system #2 located near the southwest corner of the site building receives stormwater from a proposed trench drain located across the access driveway to the lower garage level. The rim elevation of the proposed trench drain is 4.1. The results of the HydroCAD model indicate that the 2-yr flood elevation within the infiltration chamber system is elev. 8.40. This is not possible. The applicant is currently reevaluating the design of Infiltration Chamber System #2.
- 18. The applicant should provide groundwater mounding calculations as the two proposed infiltration chamber systems are designed to provide peak rate mitigation and appear to be within 4-ft of estimated seasonal high groundwater.
- 19. The HydroCAD model included in the stormwater report analyzes the proposed stormwater BMPs over a 24-hr time period.

 Recommendation: The applicant should increase the analysis time period to 72 hours to allow the BMPs to demonstrate their drain down capacity after the storm event concludes.
- 20. MassDEP Stormwater Standard #10 The applicant should provide a signed Illicit Discharge Compliance statement.

UTILITIES

- 21. The applicant proposes some drain manholes (DMH-2, 3) requiring shallow installations. For these applications the applicant should confirm the frame/cover height (standard 8-in, shallow 4-in) and that adequate cover exists over the inlet/outlet pipes for constructability.
- 22. The Utility Plans show the proposed utility services from the project site to the existing municipal/gas/electric utilities in Dorothy Road.
 - Recommendation: We recommend the Applicant coordinate with the Arlington Public Works Department and local utility companies regarding all proposed site utility connections to the public utilities in Dorothy Road to confirm compliance with applicable construction standards.
- 23. The existing survey shows an existing drain line in Dorothy Road that runs in front of the project site. The Utility Plan shows three proposed sewer service lines from the building to the existing municipal sewer in Dorothy Road that cross the drain line.

 Recommendation: The Applicant should confirm the proposed sewer services as shown do not conflict with the existing drain line.



Jenny Raitt, Director, Dept of Planning and Community Development November 20, 2020 Page 6 of 8

CONSTRUCTION

- 24. Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan Section 3.10.4 Equipment/Vehicle Maintenance and Fueling Areas:

 Recommendation: We recommend adding a provision prohibiting refueling of vehicles or equipment within 100-feet of any onsite resource area.
- 25. Recommend the applicant add a provision to the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan that "Dorothy Road shall be swept clean on a daily basis of any soils tracked onto it from the project site".
- 26. As part of a Construction Management Plan the applicant should develop a map of approved haul routes for trucks traveling to/from the project site during construction as the immediate site vicinity is comprised of narrow residential streets.

WETLAND BOUNDARY

During the site visit BETA confirmed the wetland boundaries were field delineated in accordance with the definition and methods approved in the MA DEP Delineating Bordering Vegetated Wetlands Handbook (March 1995). BETA found BSC's evaluation of the previously delineated isolated wetlands, presented on the 2006 ANRAD Plan as Wetlands F, G, H, and I, to be accurate in that the areas did not demonstrate a predominance of wetland vegetation or other indicators of hydrology.

EVIDENCE OF FILLED WETLANDS

A history of disturbance is apparent throughout much of the site with remanent piles of asphalt, piles of earthen material, and an abundance of construction stone and debris. BETA's site review included looking for evidence of potentially filled wetlands as a result of these disturbances. BETA did not look at soil profiles underlaying disturbed areas because of the potential health hazards that exist from old construction material as well as human waste present at the site. BETA examined vegetation, topography, historic aerial photographs, and historical topographic maps and found no evidence of preexisting wetlands or hydrologic conditions beyond the delineated wetlands at the site. Large cottonwood trees (Populus deltoides) and a large willow (Salix sp.), indicators of hydrology, were observed at the northeastern portion of the site and consistent with the floodplain. Based on review of historic and topographic maps aerial photographs that went back early 1893 (https://www.historicaerials.com/viewer) BETA concluded there was no indication of additional wetland conditions at the site prior to the construction of Route 2.

WILDLIFE HABITAT REVIEW AND EVALUATION

BETA reviewed the Wildlife Habitat and Vegetation Evaluation provided by BSC as well as conducted observational surveys of wildlife and habitat during the November 12, 2020 site visit. BETA's inspection of the site was done during mid-November when most wildlife is dormant, and weather was cool and overcast. A walkthrough was completed of the proposed construction and floodplain fill mitigation areas and the 100-foot buffers to BVW / AURA to evaluate existing habitat on the site. An Eastern Cottontail (Sylvilagus floridanus) was seen fleeing through the underbrush, but no other species were observed. Signs of wildlife activity seem to corroborate the previous BSC's field observations. Deer scat was found throughout the site as well as one instance of Eastern cottontail scat. Squirrel nests were found in trees throughout the site and snags containing cavities showing evidence of habitation by some tree dwelling species.



Jenny Raitt, Director, Dept of Planning and Community Development November 20, 2020 Page 7 of 8

The western end of the site, where the proposed parking lot will be located mostly consists of fallen trees, standing deadwood, tall shrubs/small trees, dense briers and woody vines. Decaying logs are common in this area providing ample ground cover for small mammals, reptiles and amphibians. This dense area of woody vines includes bittersweet, briers, and grape which provide food for local wildlife. No songbird nests were seen in this area at the time of the observation, despite the dense vegetation cover which suggests this area is not used by songbirds for protection and reproduction.

The eastern end of the site, from the eastern edge of the proposed building to the edge of the property is generally more open in the understory. There are more large standing trees in this area but with fewer decomposing logs or vegetated ground cover which provides less protection for wildlife. Suitable bat habitat, including large foliating bark trees, were not present on the site. The site has extensive stands of invasive species including Japanese knotweed (Polygonum cuspidatum) that tend to dominate the understory in some places. Japanese knotweed can provide food for pollinators but crowd out other native plant food species. Although this area has less cover and apparent food sources than the western side, a songbird nest was found, and signs of deer activity were common.

Based on the proposed plans the eastern section of the property will not be cleared as part of construction. The potential for wildlife habitat improvements exist at the site and include replacing proposed cultivar plant species with native plantings, incorporating fruit producing shrubs to encourage foraging and controlling invasive species.

CONCLUSIONS

At this early design phase, the Applicant has not provided sufficient detail regarding the disposition of site-generated stormwater runoff to determine that the proposed project is able to satisfy MassDEP Stormwater Management Regulations. The proposed stormwater management approach utilizes rooftop detention and subsurface infiltration BMPs to mitigate the impacts from the proposed site development. Absent the disposition of the rooftop stormwater detention in the stormwater calculations, it is not possible to evaluate if the requisite peak rate/volume mitigation has been provided.

The project design includes compensatory flood storage to offset proposed filling within the 100-year floodplain. The proposed volume of compensatory storage included in the calculations appears consistent with the compensatory flood storage area designated on the site plans.

The proposed site grading plans appears to demonstrate that the proposed surface grading of the site will allow it to drain properly; however, necessary revisions to the proposed stormwater management system identified in the previous comments will likely require adjustments to the grading currently shown.

The proposed utility layouts for sewer, water and drainage are shown and appear feasible. Gas, electric and tele/com utility layouts are also shown, and their final design will require coordination with the appropriate utility providers. Coordination with Town Departments regarding sewer/water service connections to municipal utilities will be required to verify compliance with Town construction standards.

BETA concurs that the functions and values provided by the site's AURA and upland floodplain habitat are currently low and we support the Applicant's 2:1 floodplain compensation proposal. A 2:1 floodplain compensation ratio begins to address climate change and resiliency by providing more storage during flooding events and also provides an opportunity to replace the invasive species and low quality native



Jenny Raitt, Director, Dept of Planning and Community Development November 20, 2020 Page 8 of 8

vegetative species with higher quality native species that provide wildlife food, cover and nesting habitat resulting in a more resilient project.

As the development design advances, there may be additional impact to the AURA and 100-year floodplain for the ZBA and Conservation Commission to consider and this may provide an opportunity for additional mitigation and habitat improvement. BETA recommends that the Applicant provide a clear commitment towards these significant mitigation opportunities on this site in their next submittal to the ZBA including floodplain and AURA/Buffer Zone restoration design details.

If you have questions about any of these comments, please feel free to contact me at (401) 333-2382.

Very truly yours, BETA Group, Inc.

Todd Undzis, P.E. Project Manager Marta Nover Vice President

cc: Jennifer Raitt, Director Department of Planning and Community Development Emily Sullivan, Environmental Planner & Conservation Commission Agent Douglas W. Heim, Arlington Town Counsel

N:\7200s\7202 Thorndike Place 40B Peer Review - Arlington\BETA's Responses\2020-11-12\2020-11-20 Thorndike Place Civil-Site Review-FINAL.docx





MASSACHUSETTS

CONSERVATION COMMISSION

November 20, 2020

Zoning Board of Appeals Town of Arlington 730 Massachusetts Avenue Arlington, MA 02474

RE: Thorndike Place – Application for Comprehensive Permit
Fourth Set of Comments from Conservation Commission
Applicant's November 2020 revised submittals & October 2020 Wetland Delineation

Dear Chairman Klein and Members of the Board:

The Arlington Conservation Commission (hereinafter "ACC") provides this fourth set of comments to the ZBA, this time addressing the information Arlington Land Realty LLC (the "Applicant") provided on October 22, 2020 (Wetland Delineation) and November 3, 2020 (revised submittals) in support of its Comprehensive Permit Application, filed with the Town on or about August 31, 2016 and supplemented in March 2020, September 2020, October 2020, and November 2020. The ACC provided initial comments to the ZBA on the Application by letter dated September 26, 2016, a second set of comments on July 9, 2020 based on the March 2020 submittals, and a third set of comments on October 9, 2020 based on the September 2020 submittals.

The ACC reviewed and comments here on the following documents provided by BSC Group (Applicant's engineer):

- 1. ZBA Transmittal Wetland Delineation 2020-10-22.pdf
- 2. Thorndike Place Wetland Delineation Memo REVISED 10-19-2020 gtd.pdf
- 3. Wetland Delineation Field Data Forms.pdf (MassDEP Bordering Vegetated Wetland Forms)
- 4. 2340700-CONSTRAINTS w Updated Wetlands.pdf (Existing Environmental Resources Plan)
- 5. ZBA Transmittal Supplemental ApplicationMaterials 2020-11-03.pdf
- 6. Report on Existing Site Conditions_Nov.2020 (00176278xBC4F6).pdf
- 7. 2020-11-03 Stormwater Report.pdf
- 8. Compliance with OS-Master Plan Statement (00176275xBC4F6).pdf
- 9. WaiverList_Nov.2020.update (00176301xBC4F6).pdf
- 10. 2020-11-03 Thorndike Place Plan Set
- 11. Thorndike-Arc-Binder-sm (002).pdf (Thorndike buildings & elevations, Nov. 2020)
- 12. 06082020ZoningBoardofAppea.pdf (Wildlife Habitat and Vegetation Evaluation, Nov. 2020)

General Comments

The ACC is pleased that the supplemental materials are responsive to many of our prior comments, including the project now proposing a 2:1 compensatory flood storage ratio (creating 2 cubic feet of new flood storage for each cubic foot of flood storage lost), an important requirement of the ACC's wetland regulation to protect the ability of the 100-year floodplain to hold flood waters.

The ACC's prior comments concerning the value of the wetland resources, vegetation replacement, floodplain, and stormwater impacts are not reiterated herein and are still valid.

Issue #1. Wetlands Delineation

BSC performed an updated Wetland Delineation in October 2020 and provided the required supporting MassDEP field forms as requested by the ACC.

- The BSC Group provided the updated Wetland Delineation and supporting field forms (dated October 15, 2020) for the site that now will enable BETA Group to review the delineations.
- Existing Environmental Resources Plan Sheet C-100 shows the BSC Wetland Delineation.
- The two isolated wetlands previously shown on site plans have been eliminated based on the October 2020 wetland delineation.

Recommended Action:

ACC understands that BETA Group has performed a review of BSC's wetland boundary delineations and will advise on whether it agrees with this updated delineation.

Issue #2. Floodplain & Compensatory Flood Storage

BSC provided floodplain delineations and flood plain storage information requested by the ACC:

- The 100-yr floodplain is identified as elevation 6.8 as depicted on Existing Conditions and Existing Environmental Resources Plans (Sheets V-100 and C-100). The Applicant uses this elevation to delineate the wetland resource area called Bordering Land Subject to Flooding.
- Compensatory storage is proposed 2:1 at two elevations.
- Proposed compensatory flood storage location is in the north central portion of site, east of the
 proposed buildings and play ground, and outside of the mapped 100-year floodplain as depicted
 on Sheet C-101 & C-105. BSC materials (the Wildlife Habitat evaluation) also indicated that an
 alternative compensatory storage location at the site of the existing homeless encampment was
 considered.
- Proposed plantings or restoration of the compensatory flood storage location after it is created is not discussed in proposal only grading of area discussed.

Other Considerations:

• The Climate Ready Boston project and the City of Cambridge's Climate Change Vulnerability Assessment (CCVA Report) assess projected flooding in the Mystic River Basin. Their studies and models point to changes in flood magnitude and frequency in the years 2050 or 2070 and beyond. These studies evaluate sea level rise and storm surges and project that larger storm surges will increase the likelihood that the Amelia Earhart Dam will be overtopped or circumvented, reversing the flow of water in the Mystic Basin and preventing freshwater from advancing downstream, thus increasing the flooding vulnerability of upstream communities. The increased vulnerability of the area surrounding Alewife Brook should be considered as part of the impact analysis on the natural and built environment required under the ZBA regulations, given the large size of the building footprint and the loss of open space/buffer resulting from development.

Recommended Actions:

- 1. ACC recommends that BETA Group verify flood storage volume lost and compensatory flood storage proposed.
- ACC recommends that the Applicant address why the alternative location for the Compensatory
 Flood Storage area in the area of the current homeless encampment is not preferable (or also
 used to supplement flood storage). As documented in the Wildlife Habitat Evaluation, it is less
 suitable for wildlife habitat.
- 3. ACC recommends that BETA Group evaluate the efficacy of the proposed compensatory flood storage location (s) to act as flood mitigation into the future, taking into consideration potential climate change impacts as required by the Comprehensive Permit under ZBA.
- 4. ACC recommends that the ZBA require the Applicant to provide a floodplain restoration plan for the proposed compensatory flood storage area of the site to mitigate for the negative environmental impacts of the vegetation removal and grading to create the compensatory flood storage area.
- 5. ACC recommends that BETA Group consider climate change impacts, in concert with BSC and in consideration of data available for Arlington in the Massachusetts Coastal Flood Risk Model (MC-FRM, communication from Woods Hole Group) and information generated by Cambridge's Climate Change Vulnerability Assessment to propose even more robust mitigation for building in the floodplain or immediately adjacent to it, considering that the base flood elevation/extent of flooding in the area is projected to rise in the coming decades.

Issue #3. Stormwater Management

BSC provided a Stormwater Report that includes results of computer modeling using HydroCAD software as requested by the ACC.

 An infiltration unit for groundwater recharge is provided, located beneath surface parking area at west of building. Indicates no loss of annual recharge. A second infiltration unit is also proposed near the building area.

- The infiltration system has been designed with a bottom elevation of 5.0 feet to provide a minimum 2-foot elevation above the groundwater table. BSC's report also indicates that the estimated groundwater elevation is based on soil investigations by others.
- Porous walkways are proposed instead of traditional impervious walkways.
- Total Suspended Solids or "TSS" removal is calculated to be greater than 80% by using deep sump catch basins, hydrodynamic separator, and an underground infiltration system.
- Watershed modeling performed using HydroCAD Stormwater software tables of peak flow discharge rates provided for 2, 10, 25, 50, and 100-year, 24-hour storm events. Post-development conditions indicate no increase to peak runoff rates.
- The source of the precipitation data used in the HydroCAD Stormwater software to calculate stormwater flows is not stated.

Other Considerations:

- There are ongoing efforts by MassDEP to update/align the Wetland Protection Act Stormwater requirements and Stormwater Management Handbook to align these with the MS4 requirements. MassDEP is now recommending TSS removal of 90% for new development.
- Whereas ACC previously recommended that the stormwater analysis use NOAA Atlas 14, ACC has since been further informed by ongoing efforts of MassDEP to update/align the Wetland Protection Act stormwater requirements and Stormwater Management Handbook to align these with the 2016 EPA Municipal Separate Storm Sewer System (MS4) requirements, to which Arlington must adhere. MassDEP is now recommending that NOAA + (NOAA Plus) for precipitation values be used. Others are recommending NOAA++. The rainfall data presented in BSC Stormwater report are lower than the NOAA+ and NOAA++ data for Dorothy Road, Arlington, MA as projected by NOAA Atlas 14 Point Precipitation Frequency Estimates at: https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ma

Recommended Actions:

ACC understands that BETA Group is reviewing the efficacy of the stormwater management design presented by BSC. Based on the results of BETA Group's evaluation, the following recommended actions are relevant to consider either for the current design or for a re-design of the stormwater management plan.

- 1. ACC recommends that the Applicant update its Stormwater Report to reflect the new minimum standards now recommended by the MassDEP Stormwater Advisory Committee, including use of NOAA+ at a minimum, 90% TSS removal, and revised recharge guidance. While ACC is aware that formal revisions to MassDEP regulations will not occur until next year, it is within the spirit of the State Executive Order 569, State Hazard Mitigation and Climate Adaption Plan, and Arlington's Comprehensive Permit Regulations to conservatively design a stormwater management system so that climate change and hazard mitigation are taken into account.
- 2. ACC recommends that existing groundwater elevations be verified, particularly if soil investigations on which the groundwater elevations are estimated are old or outdated.

- 3. ACC recommends that the Applicant further evaluate green infrastructure measures to increase the adaptive capacity and resiliency of stormwater management infrastructure.
- 4. ACC recommends that BETA Group consider climate change flooding impacts using NOAA + and NOAA++ precipitation rates to be resilient/protective for future extreme storms, consistent with the MassDEP Stormwater Advisory Committee recommendations.

Issue #4. Evaluation of Wildlife Habitat & Vegetation

BSC provided a comprehensive Wildlife Habitat and Vegetation Evaluation report supported with field survey notes, as requested by the ACC.

- The evaluation was performed using a desktop review and on-site field survey, supported by field notes. The report indicates that "Much of the site is characterized by a diverse, mature forest canopy with dense understory vegetation."
- Undesirable invasive plants are numerous in the understory as herbaceous vegetation (e.g., Garlic Mustard).
- Field survey performed for locations within the AURA, floodplain, and possible compensatory storage locations.
- There are large, desirable native trees in the canopy including Silver Maple, Cottonwood, and Red Maple, among others. The report stated that there were numerous large trees, "many of which are near or in excess of 30" DBH." BSC did not conduct an inventory of these trees; however, they stated "they were present at five (5) of the eight (8) survey plots."
- A significant feature noted was extensive amount of downed woody debris; which can be "particularly valuable to small mammals, reptiles and amphibians."
- No vernal pool habitat noted on site.
- This urban forest does have connectivity to Spy Pond and the Alewife Brook Reservation; therefore, it is not entirely isolated though dense development surrounds the parcel.
- Wildlife typical of urban forests were evident including birds and small mammals and coyote.

Recommended Action:

ACC understands that BETA Group is reviewing the Wildlife Habitat & Vegetation report and will advise on whether it agrees with this report and conclusions.

 ACC recommends that the ZBA require the Applicant quantify the numbers and types of trees (including species and DBH) that will be removed during construction in the AURA so that the ACC and BETA Group can evaluate the planting plan as mitigation for loss of canopy, wildlife habitat, and climate change resilience attributes.

Issue #5. Conservation Restriction for Undeveloped Lands of the Mugar Parcel

- The Existing Conditions memo indicates that "The Applicant has proposed that the
 environmentally sensitive portions of the site be protected by a conservation restriction or other
 appropriate land conservation mechanism."
- The Compliance with Open Space memo states that "The Applicant, the Town and its community can work together toward a path to steward the undeveloped lands, as such stewardship models may exist with other protected areas, such as the private lands at the former Symmes Hospital."

Recommended Action:

1. ACC recommends that the ZBA work with the ACC, the Arlington Land Trust, the Arlington Open Space Committee and other Town officials to propose an appropriate conservation and stewardship mechanism for the proposed undeveloped portions of the site that are protected resource areas under the Town Bylaw and implementing Wetlands regulations.

Conclusion

Once the Applicant and the BETA Group complete the recommended tasks, the ZBA will have much, if not all, of the information needed to determine whether the proposed project complies with the Arlington Wetlands Protection Bylaw and June 4, 2015 Wetland Regulations and the anticipated MassDEP Stormwater revisions.

We hope the ZBA finds the above comments helpful. Please contact us should you have questions. I and other ACC members plan on attending the ZBA's hearing on the Application on November 24, 2020.

Very truly yours,

Susan

Susan Chapnick, Chair Arlington Conservation Commission



December 9, 2020

Via Email

Christian Klein, Chair Arlington Zoning Board of Appeals 51 Grove Street Arlington, MA 02476

RE: ZBA Docket#3515 Thorndike Place, Arlington, MA

Dear Chairman Klein and Members of the Board,

On behalf of the Applicant, we wish to thank the Board for a thoughtful and focused hearing last evening to discuss matters related to wetlands and floodplain regarding the Thorndike Place 40B project. I am writing today to clarify that certain actions that have been requested or suggested to be undertaken by the BETA Group would exceed the peer review function as set out in the 40B regulations and, as such, are not expenses for which the Applicant is responsible as part of its payment of peer review fees.

Per 760 CMR 56.05(5), when the Board determines that in order to review a comprehensive permit application, it would require technical advice on areas such as civil engineering, transportation, environmental resources and design review, it may employ outside consultants and request the Applicant to provide peer review funds. The 40B regulations impose parameters regarding the allowable uses of peer review funds. Section 56.05(a) generally states that the Board shall not impose "unreasonable or unnecessary time or cost burdens on the Applicant" and that "[I]egal fees for general representation of the Board or other Local Boards shall not be imposed on the Applicant. The regulations, thereafter, more specifically require that:

- (b) A review fee may be imposed only if:
 - 1. the work of the consultant consists of review of studies prepared on behalf of the Applicant, and not of independent studies on behalf of the Board:
 - 2. the work is in connection with the Applicant's specific Project;
 - 3. all written results and reports are made part of the record before the
 - 4. a review fee may only be imposed in compliance with applicable law and the Board's rules.

760 CMR 56.05(5)(b) (emphasis added).

SMOLAK & VAUGHAN LLP

Arlington Zoning Board of Appeals December 9, 2020

During last night's hearing, John Hession presented the BSC Group's wetlands delineation and detailed how the BSC Group's wetlands scientists concluded that a small area formerly designated as Isolated Vegetated Wetland (IVW) (which is jurisdictional only under the local wetlands bylaw) did not presently qualify as isolated wetland. The BETA Group's Site Peer Review Report #3, dated November 20, 2020, likewise stated that the BSC Group evaluation was accurate.¹

Following discussion and comments presented to the Board by the Conservation Commission's Chair, Ms. Chapnick, the Board requested that BETA Group obtain additional soil samples from the area of the former isolated wetland. Should the Board seek to task the BETA Group to conduct such sampling, we respectfully remind the Board that such work is beyond the role of peer review, as it does not involve review of studies prepared by the Applicant, but instead is an independent study. Per 760 CMR 56.05(5)(b), such work is not review of a study and therefore the Applicant cannot be requested to fund such work.

On a similar vein, with reference to the written comments submitted by the Conservation Commission to the Board, the Commission recommended certain actions be undertaken by the BETA Group which likewise exceed the function of peer review. Specifically, with respect to the floodplain and compensatory storage, the Commission recommended that the BETA Group: "evaluate the efficiency of the proposed compensatory flood storage location(s) to act as flood mitigation in the future, taking into consideration potential climate change impacts..." and that the BETA Group "consider climate change impacts, in concert with BSC and in consideration of data available for Arlington in the Massachusetts Coastal Flood Risk Model... and information generated by Cambridge's Climate Change Vulnerability Assessment to propose even more robust mitigation..." See Conservation Commission letter, dated November 20, 2020, p.3 (Action Items 3 and 5). Further, with respect to the Commission's written comments on stormwater management, the Commission recommended that BETA Group "consider climate change flooding impacts using NOAA+ and NOAA++ precipitation rates to be resilient/protective for future extreme storms..." See Conservation Commission letter, dated November 20, 2020, p.5 (Action Item 4). Similar to the request for the BETA Group to undertake independent soil samples, the above-referenced action items suggested by the Commission to be undertaken by the BETA Group are beyond the role of peer review.

-

¹ The BETA Group's Site Peer Review #2 Report, dated November 2, 2020 states in pertinent part: " [d]uring the site visit BETA confirmed the wetland boundaries were field delineated in accordance with the definition and methods approved in the MA DEP Delineating Bordering Vegetated Wetlands Handbook (March 1995). BETA found BSC's evaluation of the previously delineated isolated wetlands, presented on the 2006 ANRAD Plan as Wetlands F, G, H and I, to be accurate in that the areas did not demonstrate a predominance of wetland vegetation or other indicators of hydrology." BETA Site Peer Review #2, p. 6 of 8. BETA Group's wetlands scientist made reference during her presentation last evening as to standing water possibly in the area of the former isolated wetland, but the BETA report does not indicate that a BETA consultant had first hand knowledge of the existence or characteristic of such standing water.

SMOLAK & VAUGHAN LLP

Arlington Zoning Board of Appeals December 9, 2020

Should the Board desire to engage the BETA Group to perform independent investigations with respect to the area formerly shown as IVW and/or to undertake the above actions suggested by the Conservation Commission, such services would be at the expense of the Town and are not peer review costs for which the Applicant is responsible. To ensure that record keeping is appropriately maintained, I would respectfully reiterate the Applicant's request for copies of all contracts entered into with the BETA Group as well as detailed invoices for all work performed to date as well as the future.

The Applicant looks forward to continuing the public hearing process with the Board. Should you have any questions, please do not hesitate to contact me.

Sincerely yours,

/s/ Stephanie A. Kiefer

Stephanie A. Kiefer

cc: Marta Nover, BETA Group Paul Haverty, Esq.

Jenny Raitt, Director of Planning and Community Development

Dec. 18, 2020



MASSACHUSETTS

CONSERVATION COMMISSION

December 18, 2020

Zoning Board of Appeals Town of Arlington 730 Massachusetts Avenue Arlington, MA 02474

RE: Thorndike Place – Application for Comprehensive Permit Fifth Set of Comments from Conservation Commission

Dear Chairman Klein and Members of the Board:

The Arlington Conservation Commission (ACC) provides this fifth set of comments to the ZBA in advance of its December 22, 2020 hearing to consider the wetlands and stormwater components of the Thorndike Place Comprehensive Permit Application. The Conservation Commission is providing this comment letter to assist the ZBA as it moves forward with its review of the permit application, including under the Town of Arlington Wetlands Protection Bylaw (the Bylaw).

The Conservation Commission recommends that the ZBA not grant any waivers requested by the Applicant to the Bylaw and the Commission's Wetland Regulations promulgated under the Bylaw.

Presence of Isolated Vegetated Wetlands

The ZBA should assume that Isolated Vegetated Wetlands (IVW) are present on the site (in the Northeast corner), despite the Applicant not showing them on the latest plans. This is because BETA Group's review for evidence of potentially filled wetlands "did not look at soil profiles underlaying disturbed areas" as indicated in their "Site Peer Review #2" letter, dated November 20, 2020. That is, BETA Group relied on BSC's evaluation of hydrology and did not take its own soil samples to evaluate the potential for hydric soils as an indicator of IVW. The ZBA should note that the lack of wetland vegetation is not in-and-of-itself the defining factor for IVW, especially since this is a disturbed (e.g., by filling) site and since the vegetation observed by BSC were invasives, which are inconclusive for wetland delineation. Under Section 21 of the applicable Town Wetland Regulations, where an area has been disturbed, one looks for indicators of saturated or inundated conditions sufficient to support a predominance of wetland indicator plants, even if those wetlands plants are no longer present.

Dec. 18, 2020

A preponderance of the evidence indicates that IVW are present, including: 1) IVWs were delineated and officially confirmed by the ACC in 2000 or 2001 (where BSC was the peer reviewer); 2) one of the two soil tests performed by BSC in 2020 indicate the presence of wetland soils; and 3) the 12/3/2020 memorandum from the Town Engineer strongly supports the continued presence of these IVWs.

While the Applicant's latest project redesign no longer has buildings in the IVWs, work will occur within the 100-foot Buffer Zone or Adjacent Upland Resource Area ("AURA"), so the Applicant must meet the Arlington Wetland Regulation's standards for work within the AURA (see below).

Work Proposed in AURA

As the ACC has pointed out before, Section 25 of the Arlington Wetland Regulations prohibits any work within the first 25 feet of the AURA (the No-Disturbance Zone), and work within the 25-100 foot portion of the AURA (the Restricted Zone) shall be avoided and alternatives pursued, with work allowed only if no reasonable alternatives are available.

When the Applicant proves that reasonable alternatives are not available or practicable, the Restricted Zone is evaluated as suitable for "no, temporary, limited, or permanent disturbance" based on the characteristics of the area (reference Section 25 of the Arlington Regulations for definitions).

If the ZBA decides to approve the project, the ACC asks the ZBA to include conditions that the area of IVW and their AURA be shown again on the plans (they were on the September 2020 plans), and that no disturbance be allowed within 50 feet, limited activity be allowed within the 50-75 feet, and mitigation be provided for any disturbances of the 50 -100 feet.

Vegetation Removal and Replacement

As you know, Section 24 of the Arlington Regulations for Wetlands Protection require that any vegetation removed or extensively pruned requires "in-kind replacement" in wetland resource areas including Bordering Land Subject to Flooding (the 100-year floodplain) and the AURA. This project proposes extensive vegetation removal in the AURA, including in the AURA of the IVW for the compensatory flood storage area.

"In-kind replacement" means "a combination of species type and surface area as defined by the area delineated by the drip line of the affected plant(s)."

"In-kind" means the same type and quantity of plant species that was removed, extensively pruned, or damaged. Only non-invasive plant species shall be planted as replacements.

Here, the Applicant has not provided the specific information required to demonstrate compliance with this Section of the Arlington Wetland Regulations. This includes the reasons for removal and a detailed planting plan showing the location, size, and species of vegetation to be removed as well as the proposed replacements.

While the Application provides a Planting Plan (Sheet L-100, March 13, 2020), it does not include sufficient information to evaluate whether the proposed replacement of the trees and other vegetation planned to be removed complies with Section 24 of the Regulations.

Dec. 18, 2020

The ZBA should require now, or include as a condition of approval, that the Applicant show the species, numbers, locations and care instructions of all plants in the design. The Applicant needs to describe how these plantings will compensate for the numbers, density, species and variety of vegetation that will be removed for the Project.

Stormwater Management Plan

The Applicant needs to present a Stormwater Management Plan that is responsive to the concerns and comments raised in the Conservation Commission, the Engineering Division and BETA comment letters. This includes suitable documentation accurately establishing the seasonal high groundwater elevations (within the footprint of the chambers) to ensure that there is a two-foot separation between the bottom of the infiltration chamber and the water table. It is not sufficient to presume what the water table elevation is based on past borings of an undefined date or limited exploration. The Frimpter Method should be used.

Further, the stormwater management design and system must account for any discharge from the site building roof. The disposition of rooftop stormwater must be fully evaluated and presented, both from the standpoint of managing stormwater runoff as well as addressing the MA Wetlands Protection Act's recharge standards for stormwater management. Further, to the extent that one of the infiltration chambers must be relocated to outside the sewer easement, the new locations must be identified. If the proposed stormwater management system must be resized or relocated, this could have bearing on either the footprint of the proposed building area, or the encroachment on wetland resource areas or both given the constrained nature of the site.

Precipitation Data

The Commission understands that the Applicant has used the Cornell method to derive precipitation values for the analysis, consistent with Arlington's current wetland protection regulations. Since the Applicant has previously indicated its desire to address the community's environmental concerns, the Commission continues to respectfully request that the Applicant conduct an analysis using NOAA+ values. The MADEP indicates that NOAA+ precipitation values incorporates risk observed in the current data (storm data based on storms up to 2014) to reflect the range of larger observed storms. The Commission has required such analysis for another large town of Arlington development and such analysis was accordingly conducted. We are hopeful that the environmental impact assessment for this project will reflect the current state of knowledge. While use of NOAA+ plus data could increase the size of the required stormwater management features, we feel this level of protection is warranted in this area vulnerable to flooding.

Low Impact Development

Per MADEP's Stormwater Management design guidance, the Conservation Commission continues to advocate for low impact development techniques/alternatives that minimize land disturbance and impervious surfaces.

Dec. 18, 2020

Conclusion

The Conservation Commission urges the ZBA not to grant any waivers requested by the Applicant from the Bylaw and the Town's wetlands bylaw and regulations as these provide flood control, storm damage prevention, and other interests of local concern.

We hope the ZBA finds the above comments helpful in providing clarity on missing information for Stormwater Management and providing direction on mitigation and conditions for protection of wetland resource areas including IVW, floodplain, and the AURA. Please contact us should you have questions. I and other ACC members plan on attending the ZBA's continued hearing on the Application on December 22, 2020.

Very truly yours,

Susan

Susan Chapnick, Chair Arlington Conservation Commission



Town of Arlington, Massachusetts

Notice of Intent

Summary:

7:45pm

Notice of Intent: Arlington Reservoir Master Plan Phase 2, 210 Lowell Street

MassDEP File #091-0327

This project consists of the second phase of implementation of the Arlington Reservoir Master Plan and includes the following activities: parking area and stormwater improvements; improvements to existing pathways to make them accessible under the Americans with Disabilities Act (ADA); renovation and addition of new recreational facilities; shoreline bank stabilization; and upland habitat restoration and invasive species removal. Proposed project work is within the 100-ft Wetlands Buffer and Inland Bank area of the Arlington Reservoir.

ATTACHMENTS:

	Туре	File Name	Description
D	Notice of Intent	Arlington_Reservoir_Phase_2_NOI_12032020.pdf	Res Phase 2 NOI
D	Notice of Intent	Arlington_Reservoir_Phase_2_NOI_Plans_12032020.pdf	Res Phase 2 NOI Plans
D	Notice of Intent	Arlington_Reservoir_Phase_2_Stormwater_Report_12032020.pdf	Res Phase 2 Stormwater Report



Notice of Intent:

Arlington Reservoir Renovation Project – Phase 2 Arlington/Lexington, Massachusetts

December 2020

PREPARED FOR

Arlington Parks & Recreation Commission Arlington, Massachusetts

PREPARED BY

SWCA Environmental Consultants Kyle Zick Landscape Architecture, Inc.

SWCA Project No.: 60780



Amherst Office 15 Research Drive Amherst, Massachusetts 01002 Tel 413.256.0202 Fax 413.256.1092

December 3, 2020

Arlington Conservation Commission 730 Mass Ave. Annex Arlington, MA 02476

Re: Arlington Reservoir Project Notice of Intent Arlington & Lexington, MA

Dear Members of the Conservation Commission:

On behalf of the Town of Arlington ("Applicant"), SWCA Environmental Consultants ("SWCA") and Kyle Zick Landscape Architecture (KZLA) have prepared this Notice of Intent ("NOI") application for work within regulated resource areas and buffer zone associated with the Bathing Beach Improvements to the Arlington Reservoir in Arlington and Lexington, Massachusetts. This NOI is being submitted pursuant to the Massachusetts Wetlands Protection Act ("WPA") (M.G.L. Ch. 31 s. 40) and its implementing regulations at 310 CMR 10.00, the Arlington Wetlands Protection Bylaw ("Arlington Bylaw") and the Lexington Wetlands Protection Bylaw ("Lexington Bylaw"). The Project consists of improvements to the reservoir's existing walking path, bank stabilization, and upland habitat restoration to manage invasive species.

The Project will require work on Inland Bank, and the 100-foot buffer zone to Inland Bank, as regulated under the WPA and the Bylaws. Work being proposed in the buffer zone is within a previously developed, recreational area and is intended to improve recreational access to the public. Some work along the pond bank will require minimal encroachment into the pond for the purposes of bank stabilization and establishment of native plants; however, the encroachment will consist of biodegradable stacked coir logs and native plants to establish an aquatic shelf to help stabilize the bank. The area along the bank above the created aquatic shelf will be regraded and restored with native plantings (please refer to the attached Design Development Set prepared by SWCA for details). The project team has met with members of both the Arlington and Lexington Conservation Commissions on-site and discussed the proposed work and have concurred that the proposal is the least impacting alternative to achieve the goals of: improved public access, bank stabilization, and upland restoration. Although many of the proposed activities meet the Limited Project provisions at 310 CMR 10.53(3) and (4), the Project has been designed to meet the performance standards for all wetland resource areas to the maximum extent practicable.

Notification has been made on this date to abutters. A copy of the abutter notification form is provided in Appendix A. As a municipal project, the work is exempt from State and Local filing fees.

SWCA respectfully requests that the Arlington Conservation Commission finds the Project adequately protective of the interests of the WPA and Bylaw and issue an Order of Conditions allowing the Project to proceed as described in this NOI. We look forward to presenting this Project to the Conservation Commission.

An NOI is being submitted separately to the Lexington Conservation Commission in mid-December. Since work at the Res spans the Towns of Arlington and Lexington, we request that the Conservation Commissions coordinate language in the Orders of Conditions so that the site contractors may work with one set of Conditions. If you have any questions regarding this application or would like to set up a site walk, please do not hesitate to contact me at 413-531-7156.

Sincerely,

Mickey Marcus, PWS

cc. MassDEP, Northeast Regional Office
Town of Arlington Parks and Recreation Commission
Kyle Zick Landscape Architecture
Woodard & Curran Engineering

WPA FORM 3

Arlington



Bureau of Resource Protection - Wetlands

WPA Form 3 - Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Arlington City/Town

Important:
When filling out
forms on the
computer, use
only the tab key
to move your
cursor - do not
use the return
key.





Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

210 Lowell Street	Arlington	02476			
a. Street Address	b. City/Tow				
Latitude and Longitude:	42.42833				
	d. Latitude	e. Longitude			
Map 61 Block 1	Lot 4	THE I			
f. Assessors Map/Plat Number	g. Parcel /L	ot Number			
Applicant:					
Joseph	Conne				
a. First Name	b. Last	Name			
Town of Arlington Parks & R	Recreation Commission				
c. Organization					
d. Street Address					
Arlington	Massachuse	tts 02476			
e. City/Town	f. State	g. Zip Code			
781-316-3880	iconnelly@to	wn.arlington.ma.us			
	x Number j. Email Address				
a. First Name b. Last Name					
c. Organization d. Street Address					
:	f. State	g. Zip Code			
e. City/Town	i. State	g. 21p 000e			
h. Phone Number i. Fa	x Number j. Email address				
Representative (if any):					
Mickey	Marcu	ıs			
a. First Name	b. Last	Name			
SWCA Environmental Inc					
c. Company					
15 Research Drive					
d. Street Address	BAA.	01002			
Amherst e. City/Town	MA f. State	g. Zip Code			
413-531-7156	mmarcus@s	The state of the s			
	x Number j. Email address				
	A CHILL SELECT				
Total WPA Fee Paid (from I	NOI Wetland Fee Transmittal Forr	n):			
ATVA	N/A	N/A			
N/A	b. State Fee Paid	c. City/Town Fee Paid			



Massachusetts Department of Environmental Protection Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Mas	DEP File Number
Doci	ment Transaction Number
Arli	ngton
	Town

A. General Information (continued)

6,	General Project Description:				
	The Arlington Parks and Recreation Commission Project Phase II, which includes parking area impropathways, new recreational facilities, a boat launce measures, and invasive species control/upland has	rovements, installation of new ADA-accessible h, bathing beach improvements, bank stabilization			
7a.	Project Type Checklist: (Limited Project Types se	ee Section A. 7b.)			
	1. Single Family Home	2. Residential Subdivision			
	3. Commercial/Industrial	4. Dock/Pier			
	5. Utilities	6. Coastal engineering Structure			
	7. Agriculture (e.g., cranberries, forestry)	8. Transportation			
	9. X Other				
[10	If the proposed activity is eligible to be treated as CMR10.24(8), 310 CMR 10.53(4)), complete and Project Checklist and Signed Certification.	an Ecological Restoration Limited Project (310 attach Appendix A: Ecological Restoration Limited			
8.	Property recorded at the Registry of Deeds for:				
	Middlesex County	N/A			
	a. County	b. Certificate # (if registered land)			
	01	01			
	c. Book	d. Page Number			
B.	Buffer Zone & Resource Area Imp	pacts (temporary & permanent)			
		경우, 기본 : [1일 10일 2일 HP] (1일 12일 HP] (1일 HPP) (12] (12] (12] (12] (12] (12] (12] (12]			
1.	Buffer Zone Only – Check if the project is local				
2.	Vegetated Wetland, Inland Bank, or Coastal Resource Area. ☑ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3,				
4.	Coastal Resource Areas).				
	Check all that apply below. Attach narrative and a project will meet all performance standards for eastandards requiring consideration of alternative programmer.	ich of the resource areas altered, including			



For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Massachusetts Department of Environmental Protection Bureau of Resource Protection - Wetlands

WPA Form 3 - Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Pr	rovided by MassDEP:
	MassDEP File Number
	Document Transaction Number
	Arlington

City/Town

B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

	Resource Area		Size of Proposed Alteration Proposed Replacement (i				
		David	2,000 (approximately)	2,000 (approximately)			
	a. 🛛	Bank	1. linear feet	2. linear feet			
	b. 🔲	Bordering Vegetated	0	0			
		Wetland	1. square feet	2. square feet			
	с. 🗌	Land Under	1. square feet	2. square feet			
		Waterbodies and	0				
		Waterways	3. cubic yards dredged				
	Resour	rce Area	Size of Proposed Alteration	Proposed Replacement (if any)			
	d. 🔲	Bordering Land					
	10000	Subject to Flooding	1. square feet	2. square feet			
	- 4		3. cubic feet of flood storage lost	4. cubic feet replaced			
	е. 🗌	Isolated Land Subject to Flooding	1. square feet				
			2. cubic feet of flood storage lost	3. cubic feet replaced			
	f. 🛛	Riverfront Area	Mill Brook (inland)				
	1. Name of Waterway (II available) Specify Souther of Mana						
	2. Width of Riverfront Area (check one):						
		25 ft Designated I	Densely Developed Areas only				
		☐ 100 ft New agricultural projects only					
	3.	3. Total area of Riverfront Area on the site of the proposed project: 30,000 square feet					
	4.	Proposed alteration of the	Riverfront Area:				
		W-221-1-1222-1-1-1-1-1-1-1-1-1-1-1-1-1-1		0			
	a.	total square feet	b. square feet within 100 ft.	c. square feet between 100 ft. and 200			
	5. Has an alternatives analysis been done and is it attached to this NOI? ☐ Yes ☒ No						
	6.	Was the lot where the act	vivity is proposed created prior to A	ugust 1, 1996? ⊠ Yes ☐ No			
3.	☐ Co	astal Resource Areas: (Se	ee 310 CMR 10.25-10.35)				
Note: for coastal riverfront areas, please comple			s, please complete Section B.2.f.	above.			



Bureau of Resource Protection - Wetlands

WPA Form 3 - Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Number
nsaction Number

City/Town

B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

4.

5.

Resource Area		Size of Proposed Alteration Proposed Replacement (i	
a. 🔲	Designated Port Areas	Indicate size under Lan-	d Under the Ocean, below
b. 🔲	Land Under the Ocean	1. square feet	
		2. cubic yards dredged	
с. 🔲	Barrier Beach	Indicate size under Coas	tal Beaches and/or Coastal Dunes below
d. 🔲	Coastal Beaches	1. square feet	2. cubic yards beach nourishment
е. 🗌	Coastal Dunes	1. square feet	2. cubic yards dune nourishment
		Size of Proposed Alterati	ion Proposed Replacement (if any)
f. 🗌	Coastal Banks	1. linear feet	
g. 🔲	Rocky Intertidal Shores	1. square feet	
h. 🔲	Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
i. 🔲	Land Under Salt Ponds	1. square feet	
		2. cubic yards dredged	
j. 🗌	Land Containing Shellfish	1. square feet	_
k. 🔲	Fish Runs		stal Banks, inland Bank, Land Under the nd Under Waterbodies and Waterways,
		1. cubic yards dredged	
i. 🔲	Land Subject to Coastal Storm Flowage	1, square feet	
If the	estoration/Enhancement project is for the purpose o		vetland resource area in addition to the 3.h above, please enter the additional
a. squa	re feet of BVW	b. square	e feet of Salt Marsh
☐ P	roject Involves Stream Cro	ssings	
a. numl	per of new stream crossings	b. numb	er of replacement stream crossings

268 of 842



Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

MassDEP File Number
Document Transaction Number
Arlington
City/Town

Ma	assachusetts Wetlands P	rotection Act M.	.G.L. c. 131, §40	Arlington City/Town	
C.	Other Applicable St	andards and	d Requirements		
	This is a proposal for an E complete Appendix A: Eco (310 CMR 10.11).			Skip Section C and ecklists – Required Actions	
St	reamlined Massachusetts	Endangered Sp	pecies Act/Wetlands	Protection Act Review	
1,	Is any portion of the propose the most recent Estimated Haward Natural Heritage and Endang Massachusetts Natural Heritahttp://maps.massgis.state.ma	abitat Map of State gered Species Prog age Atlas or go to	e-Listed Rare Wetland V gram (NHESP)? To viev	Rare Wildlife as indicated on Vildlife published by the w habitat maps, see the	
	a. ☐ Yes ☒ No If ye	s, include proof o	of mailing or hand deli	very of NOI to:	
	2017	Natural Heritage an Division of Fisherie 1 Rabbit Hill Road Westborough, MA		rogram	
	If yes, the project is also sub CMR 10.18). To qualify for a complete Section C.1.c, and complete Section C.2.f, if apply completing Section 1 of the up to 90 days to review (unless to the complete section 1).	streamlined, 30-da include requested plicable. If MESA s his form, the NHES	ay, MESA/Wetlands Pro materials with this Noti supplemental informatio SP will require a separat	otection Act review, please ce of Intent (NOI); OR on is not included with the NOI, the MESA filing which may take	
	c. Submit Supplemental Information for Endangered Species Review*				
	1. Percentage/acrea	age of property to	be altered:		
	(a) within wetland Resource Area		percentage/acreage		
	(b) outside Resource	Area	percentage/acreage		
	2. Assessor's Map	or right-of-way pla			
2.	Project plans for entire p wetlands jurisdiction, showin tree/vegetation clearing line,	g existing and pro	posed conditions, existi	as and areas outside of ng and proposed	
	(a) Project description	on (including desc	ription of impacts outsid	le of wetland resource area &	
		presentative of the	site		

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process. not required as part of the Notice of Intent process. Page 5 of 9 wpaform3.doc • rev. 2/8/2018

^{*} Some projects not in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/). Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.



Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Pro	vided by MassDEP:
	MassDEP File Number

Document Transaction Number Arlington City/Town

C. Other Applicable Standards and Requirements (cont'd)

	(c) [] http://v	MESA filing fee (fee information availa	tory review/mesa/mesa	fee schedule.htm).	
		check payable to "Commonwealth of Ma address	issachusetts - NHESP" ar	nd <i>mail to NHESP</i> at	
	Project	s altering 10 or more acres of land, also sub	bmit:		
	(d)	Vegetation cover type map of site			
	(e) 🗌	Project plans showing Priority & Estim	ated Habitat boundaries		
	(f) OF	R Check One of the Following			
	1, 🗆	Project is exempt from MESA review. Attach applicant letter indicating which http://www.mass.gov/dfwele/dfw/nhes the NOI must still be sent to NHESP if 310 CMR 10.37 and 10.59.)	p/regulatory review/mesa	a/mesa exemptions.htm;	
	2.	Separate MESA review ongoing.	a. NHESP Tracking #	b. Date submitted to NHESP	
	3, 🔲	Separate MESA review completed. Include copy of NHESP "no Take" det Permit with approved plan.	ermination or valid Conse	ervation & Management	
3,	For coasta	al projects only, is any portion of the prop fish run?	posed project located belo	ow the mean high water	
	a. Not applicable – project is in inland resource area only b. Yes No				
	If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:				
	South Shore - Cohasset to Rhode Island border, and the Cape & Islands: North Shore - Hull to New Hampshire border:				
	Southeast I Attn: Enviro 836 South I New Bedfor	Marine Fisheries - Marine Fisheries Station onmental Reviewer Rodney French Blvd. rd, MA 02744	Division of Marine Fisher North Shore Office Attn: Environmental Revi 30 Emerson Avenue Gloucester, MA 01930	ewer	
	Email: DM	F.EnvReview-South@state.ma.us	Email: <u>DMF.EnvRevie</u>	ew-North@state.ma.us	

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.



Online Users: Include your document transaction number

(provided on your receipt page) with all supplementary information you submit to the

Department.

Massachusetts Department of Environmental Protection

Bureau of Resource Protection - Wetlands

WPA Form 3 - Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided	by	MassDEP:

MassDEP File Number

Document Transaction Number Arlington City/Town

C. Other Applicable Standards and Requirements (cont'd)

4.	s any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?			
	. ☐ Yes ☒ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEF Website for ACEC locations). Note: electronic filers click on Website.			
	ACEC			
5.	s any portion of the proposed project within an area designated as an Outstanding Resource Water ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?			
	. ☐ Yes ☒ No			
6.	s any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105			
	. ☐ Yes ⊠ No			
7.	s this project subject to provisions of the MassDEP Stormwater Management Standards?			
	Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if: 1. Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)			
	2. A portion of the site constitutes redevelopment			
	3. Proprietary BMPs are included in the Stormwater Management System.			
	No. Check why the project is exempt:			
	1. Single-family house			
	2. Emergency road repair			
	3. Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.			
D.	Additional Information			
	This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).			
	Applicants must include the following with this Notice of Intent (NOI). See instructions for details.			
	Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.			
	USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the si (Electronic filers may omit this item.)			

Plans identifying the location of proposed activities (including activities proposed to serve as

a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative

to the boundaries of each affected resource area.

2.



Massachusetts Department of Environmental Protection Bureau of Resource Protection - Wetlands

WPA Form 3 - Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

MassDEP File Number
Document Transaction Number
Arlington
City/Town

Additional Information (cont'd)

	b. F	le Zick Landscape Architecture, Inc	Kyle Zick, RLA c. Signed and Stamped by varies		
	September 25, 2020 d. Final Revision Date		e, Scale		
		nk Restoration Plans, SWCA	o, coale	September 29, 2020	
		dditional Plan or Document Title		g. Date	
	5. If there is more than one property owner, please attach a list of these property owners not listed on this form.			property owners not	
	6. 🗌	Attach proof of mailing for Natural Herita	age and Endangered Species	Program, if needed.	
	7.	Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.			
	8. Attach NOI Wetland Fee Transmittal Form				
	9. 🛛	Attach Stormwater Report, if needed.			
E.	Fees				
	 Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority. 				
	Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment.				
	2. Municipal Check Number		3. Check date		
	4 State	Check Number	5. Check date		

7. Payor name on check: Last Name

4. State Check Number

6. Payor name on check: First Name



Bureau of Resource Protection - Wetlands

WPA Form 3 - Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Arlington

City/Town

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

Anona Com	11/12/2020
1. Signature of Applicant	2. Date
Signature of Property Owner (if different) Digitally signed by Mickey Marcus	4. Date
DN: cn=Mickey Marcus, o=SWCA Environmental Consultants, ou, email=mmarcus@swca.com,	6. Date

For Conservation Commission:

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:

If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

NOTICE OF INTENT N ARLINGTON RESERVOIR RENOVATION PROJECT-PHASE 2 ARLINGTON AND LEXINGTON, MASSACHUSETTS

Prepared for

Arlington Parks & Recreation Commission

422 Summer Street Arlington, MA 02474 Attn: Joseph Connelly, Director

SWCA Environmental Consultants

15 Research Drive Amherst, MA 01002 413-531-7156 www.swca.com

Kyle Zick Landscape Architecture, Inc.

36 Bromfield Street Boston, MA 02108 617-451-1018 www.kylezick.com

SWCA Project No. 60780

December 2020

CONTENTS

1	Introduct	ion	1
2	Site Descr	iption	1
		land Resources	
	2.1.1	Land Under Waterbodies and Waterways	
	2.1.2	Inland Bank	
	2.1.3	Bordering Land Subject to Flooding	
	2.1.4	Buffer Zone/Erosion Control.	
	2.2 Othe	er Sensitive Resources	3
	2.2.1	Natural Heritage and Endangered Species Review Program (NHESP)	3
	2.2.2	Outstanding Resource Waters and Areas of Critical Environmental Concern	
3	Proposed	Work	4
	3.1 Proj	ect Description	4
	3.1.1	Parking Area Improvements	
	3.1.2	Stormwater Management	
	3.1.3	Walking Path Improvements	5
	3.1.4	Other Recreational Structures	
	3.1.5	Bank Stabilization	
	3.1.6	Upland Habitat Restoration/Invasive Species Removal	7
	3.2 Proj	ect Impacts	8
		gation Measures	
4	Regulator	y Review	9
5	J	•	9

Appendices

Appendix A. Abutter Information

Appendix B. Figures

Appendix C. Site Photographs

Appendix D. Project Plans

Appendix E Stormwater Report

1 INTRODUCTION

SWCA Environmental Consultants (SWCA) in conjunction with Kyle Zick Landscape Architecture (KZLA) and Woodard & Curran Engineering (W&C) have prepared this Notice of Intent (NOI) on behalf of the Town of Arlington Parks & Recreation Commission for the proposed Arlington Reservoir Renovation Project – Phase 2 (Project). The Project consists of the second phase of implementation of the Arlington Reservoir Master Plan and includes the following activities:

- parking area and stormwater improvements
- improvements to existing pathways to make them accessible under the Americans with Disabilities Act (ADA)
- renovation and adding new recreational facilities, including renovations of the existing bathhouse and concessions building, lifeguard stands, picnic tables, a playground, a multi-use court, boat launch, check-in shelter, and several other site improvements.
- bank stabilization measures along the reservoir shore; and
- upland habitat restoration / invasive species removal.

This project work is a continuation of the Phase I Master Plan for the Res completed in 2018 by the Town of Arlington and Weston & Sampson engineers.

This joint NOI is submitted to the Arlington and Lexington Conservation Commissions pursuant to the Massachusetts Wetland Protection Act (WPA) MGL c.131 §40 and its Regulations, 310 CMR 10.00, the Arlington Wetlands Protection Bylaw (Arlington Bylaw) and the Lexington Wetlands Protection Bylaw (Lexington Bylaw) for activities within jurisdictional wetland resource areas and buffer zones. A copy of the NOI has also been provided to the Massachusetts Department of Environmental Protection (MassDEP).

We are providing both the Towns of Arlington and Lexington with a full set of the site plans. Separate NOI forms have been prepared for each of the Towns.

2 SITE DESCRIPTION

The Arlington Reservoir (Res) is in the Arlington Heights neighborhood with Lowell Street on the eastern side of the property. Although all the Res and its shoreline are owned by the Town of Arlington, approximately half of the area is located within the Town of Lexington. The total area of the Res is approximately 65 acres. The 28 acre reservoir was created in 1871 for use as a water supply by damming Munroe Brook. The Res is no longer used as a water supply source. The Res currently offers the community with recreational opportunities for swimming, fishing, walking, non-motorized boating, and other outdoor pursuits. During the summer months, the Town of Arlington operates a chlorinated and filtered swim area, separated from the main body of the pond by an Embankment. Facilities at the bathing beach are proposed to be updated, and several of these facilities are within the 100 foot buffer zone.

There is a gravel parking area off Lowell Street which is the primary site access. A dam with two outlets for flood mitigation is maintained and is in good condition having been rebuilt in 2006. A nearly one mile long walking path encircles the Res. There has been an active program to control invasive aquatic vegetation within the open water, and this NOI does not overlap with these activities, except to provide a reinforced boat ramp to permit weed harvesters better access to the water.

1

276 of 842

The pond banks are heavily eroded due to a combination of natural wind/water erosion, but also due to fishing and pond edge access for recreation.

Munroe Brook enters the Res on the northwest in the Town of Lexington, and the outlet is to the south in Arlington via a dam at the confluence with Sickle Brook to form Mill Brook.

2.1 Wetland Resources

The Arlington and Lexington Conservation Commission have previously reviewed project work and wetlands at the Res. The Arlington Conservation Commission issued Orders of Conditions for file 091-0304 for work at the bathing beach and a test plot of the walking path, and the Lexington Conservation Commission issued Orders for this same project work under DEP File: 201-1117 on January 7, 2019. This NOI is a continuation of the previous project work, but since there is additional work in wetland Resource Areas (primarily for bank restoration and beach renovation) a new NOI is appropriate rather than to amend the previous Orders of Conditions. We will request that the open Orders for both Towns should be closed.

Given the heavy use of the Res by residents, we did not place flagging tape to show the top of the bank. These areas were surveyed and are shown on the site plan. There is no BVW proposed to be altered as part of this project. We describe invasive species control within the uplands, and a significant amount of this work will be within the 100 foot buffer of the Res. The Town of Arlington has determined not to remove any trees, even those which may be non-native; the invasive species control/removal will be herbaceous vegetation and shrubs.

2.1.1 Land Under Waterbodies and Waterways

The entire Res (approximately 28 acres) is LUW. The Town of Arlington has retained Solitude Lake Services to help manage the invasive aquatic vegetation (preliminary water chestnut), and this NOI does not propose work within LUW. The bank stabilization and restoration work proposed is within the Bank wetland resource area.

No work is proposed within any of the perennial or intermittent streams on the Res. Work for the walking path reconstruction and bank stabilization will be within the 200 foot Riverfront Area of Munroe Brook, but there is no new clearing or permanent alteration of habitat.

2.1.2 Inland Bank

Embankment. A stone berm separates the bathing beach from the main body of the Res and is located both in Arlington and Lexington (see site plans L1.1 and L1.2). The total area is approximately 12,520 square feet and is jurisdictional bank (10.54). This area is currently overgrown and vegetated with trees and shrubs and provides both an informal walking path as well as wildlife habitat. Although it is "bank", it is not deemed to provide important wildlife habitat (10.54 (4)(a)(5) due to the stone construction. It is proposed to clear this area of invasive vegetation (multiflora rose, autumn olive, bittersweet, purple loosestrife). Poison ivy on the embankment is also proposed to be removed. Work on the embankment is to provide better public access, including ADA compliant use. The trees are not proposed to be cut.

Pond Bank. Most of the banks of the Res are steep and eroded. This NOI proposes to repair all the eroded banks over time (see bank restoration figure). We have surveyed the edge of the Res and have shown a color-coded map of the erosion observed during the summer of 2020. The areas shown in red (Treatment A) shows heavily eroded areas with more than 12 inch high banks, with a vertical profile. The areas shown in Orange (Treatment B) are moderately eroded vertically banks less than 12 inches high.

2 277 of 842

The Yellow areas (Treatment C) are stable banks with little or no erosion, and no recommendations for stabilization, except for restoring vegetation along the bank and adjacent slopes. The Green areas (Treatment D) are stable banks with good vegetation cover, and no action or treatments are proposed, except for the removal of invasive species. We are recommending that four separate Treatment A areas should be the first phase of bank restoration. These are locations are shown on sheet 2 of the restoration site plans and include: 305 feet adjacent to the parking lot and boat launch; 270 feet along the outlet structure (used for fishing); 145 feet along an area of an eroded piped inlet; and 125 linear feet adjacent to the Munroe Brook inlet. These four eroded and unstable areas are the highest priority for the first phase of bank stabilization.

The proposed bank stabilization exceeds the 50 foot wildlife habitat threshold; however, the bank restoration may be permitted by the Conservation Commissions as the proposed work will not have an adverse effect on wildlife habitat in accordance with the procedures contained in 10.60. We are proposing all biodegradable materials and native plantings to reduce erosion, and enhance wildlife habitat features along the shoreline of the Res.

The proposed work extends from the lower boundary of Bank to the upper boundary of Bank. The lower boundary fluctuates based on the reservoir level but is typically 156.8 feet.

2.1.3 Bordering Land Subject to Flooding

The water level within the Res is controlled by the dam and two outlet control structures. No alteration of BLSF is proposed.

2.1.4 Buffer Zone/Erosion Control

Almost the entire Res property is within the 100 buffer zone to the banks of the Res, or inlet/outlet streams. There is significant new work proposed within the buffer zone, and sediment and erosion controls are proposed adjacent to all new work activities, include the bank restoration work.

Compost filled filter socks are proposed to be used in the upland areas adjacent to all site work to protect the Res from sedimentation. For the bank restoration we are proposing the use of a turbidity curtain to be placed between the edge of the work at the open water to protect the Res from site work and erosion during construction. Silt sacks will be installed in existing catch basins draining to the Res, and tree protection fencing will be used to separate and protect existing trees during construction activities. Site Plan LD1.1 shows the details of the proposed erosion controls.

2.2 Other Sensitive Resources

SWCA reviewed the Massachusetts Geographic Information System (MassGIS) to determine if the proposed project is within or near other sensitive environmental areas. These areas included protected rare species, important watersheds, and other special environmental characteristics. There are no known sensitive resources within the work area.

2.2.1 Natural Heritage and Endangered Species Review Program (NHESP)

SWCA reviewed the MassGIS database to determine if the project is located within or adjacent to areas designated as NHESP Priority Habitats of Rare Species, Estimated Habitats of Rare Wildlife, certified vernal pools (CVP), or potential vernal pools (PVP). No Priority Habitats, Estimated Habitats, CVPs or

3 278 of 842

PVPs are mapped by MassGIS in the area. No potentially certifiable vernal pools were noted during field investigations.

2.2.2 Outstanding Resource Waters and Areas of Critical Environmental Concern

SWCA reviewed the MassGIS database to determine if the site is located within Outstanding Resource Waters (ORWs) or Areas of Critical Environmental Concern (ACECs). ORWs are watershed areas that have been classified as such under the Massachusetts Surface Water Quality Standards and are areas that contain surface waters and their tributaries, including certain wetlands, that have been designated for protection based on their outstanding socio-economic, recreational, ecological and/or aesthetic values. These waters have been identified so that the quality of the waters may be protected and maintained. ACECs are areas designated in Massachusetts that receive special recognition because of the quality, uniqueness, and significance of its natural and/or and cultural resources. There are no ORWs or ACECs located within or adjacent to the proposed project area.

3 PROPOSED WORK

The goal of this project work by the Tow of Arlington is to improve the recreational opportunities of the entire Res property, and to improve the ecological health of the pond. The Town of Arlington has recognized that the stormwater management of the Res should be improved, and the sediment and nutrient loading into the Res could be improved by improvements to the existing parking areas, and shoreline. The following is a summary of the proposed work as outlined in the site plans.

3.1 Project Description

The Project consists of the second phase of implementation of the Arlington Reservoir Master Plan and includes the following activities:

- parking area improvements
- Stormwater upgrades
- improvements to existing pathways to make them accessible under the Americans with Disabilities Act (ADA)
- renovated or new recreational facilities, including renovations of the existing bathhouse and concessions building, lifeguard stands, picnic tables, a playground, a multi-use court, boat launch, check-in shelter, and several other surficial site improvements
- bank stabilization measures along the reservoir shore; and
- upland habitat restoration / invasive species removal.

Depending on permitting, and bidding, the construction activities are expected to begin in March 2021 and to be completed in November 2021. The Town anticipates that the bank restoration work will be completed as funding allows, starting with the most eroded locations as shown on the restoration site plans. Each of these activities are further described below.

4 279 of 842

3.1.1 Parking Area Improvements

The existing gravel parking area will be replaced with permeable concrete pavers, porous pavement, and concrete pavement. Accessible parking will be incorporated into the parking lot, and a concrete boat launch area will be established for non-motorized boats, and to ensure entry to the open water for the weed harvester used for aquatic species removal and control. Benches, a canoe storage rack, and revegetation plan are proposed within the redeveloped parking lot. Site plan L2.2 shows the details of the parking area.

The Arlington Parks & Recreation Commission proposes to install porous pavement over the approximately 0.5-acre gravel parking area in the southern portion of the site.

3.1.2 Stormwater Management

A stormwater management report in compliance with DEP stormwater regulations was prepared by Woodard & Curran and dated October 2020. The proposed design uses Low Impact Development designs as recommended in the Phase I Master Plan (2018) and with current DEP stormwater management recommendations. The project work will use porous pavement materials to replace a 0.5 acre gravel parking lot. The proposed stormwater measures also include the renovation of the existing bathhouse ad concessions building, the installation of new ADA accessible concrete pathways, the playground, boat launch, an athletic court, and several other surficial site improvements. The proposed work is a redevelopment project as there are no new development areas, only improvements of existing developed areas, and the improvement of stormwater management and water quality to the Res.

In accordance with the MA stormwater regulations, storm events from 1 year (2.67 inches) to the 100 year storm event (8.85 inches) were evaluated. The parking lot restoration includes a 21,500 square foot area of porous pavement, and the multi-purpose athletic court is also designed with permeable materials to maximize infiltration. In addition to the multi-layers of stone and gravel, the design has built in sufficient storage capacity to retain the 100 year storm event. Beyond this storm event, the drainage will discharge via three outlets to the Res.

The goal of the stormwater management is to improve the existing site conditions by infiltrating stormwater rather than having a direct overland flow into the Res. We anticipate immediate improvements to water quality in the Res by reducing the nutrient load and reducing the total suspended solids currently in the stormwater runoff.

The stormwater calculations (see page 9 of the stormwater report) shows a net decrease in the post development rate of runoff from the 1 year to the 100 year storm event, and full compliance with the DEP stormwater management standards. A copy of the DEP stormwater checklist is included at the end of the stormwater management report.

3.1.3 Walking Path Improvements

The existing walking path is composed of gravel and un-improved packed dirt and un-even surfaces. It is proposed to replace the existing trail with an 8 foot wide to 12 foot wide crushed granite path, with an alternate design using a rubber surfaced trail. The rebuilt trail will be installed around the circumference of the Res to replace the existing trail with a uniform and ADA compliant surface. The surface will be underlain by a crushed stone base. Plan Sheet LD1.2 provides the details of the walking path.

5 280 of 842

Additional paths which join other walkways will be re-built and made ADA compliant. All walking paths are within the 100 foot buffer zone to the Bank, and sediment and erosion controls are proposed (compost sock) adjacent to all work areas until the construction is completed and the site stabilized.

3.1.4 Other Recreational Structures

The proposed work will rebuild the bathing beach & recreational facilities to include a new playground, ADA compliant access, refreshing bathing beach sand, concession buildings, athletic court, pump house, and bathhouse. The existing buildings will be fully renovated. Sheets L1.1 shows the northern end of these facilities, and L1.2 shows the southern end of the facilities. There are additional structures proposed around the Res and these include benches, trash and recycling receptacles, a large hexagonal bench, a picnic pavilion, boulders, signage, and other similar features.

Almost all work is within the 100 foot buffer zone to the banks of the Res, and sediment and erosion controls (compost sock) is proposed to be installed between all work areas and the open water, including on either side of the embankment. These locations are shown on the site plan LD1.2 and LD1.3.

A new boat launch is proposed for recreational non-motorized boats. It is proposed using an articulating concrete block ramp (see Plan detail on Sheet LD1.3) which will allow the launching of the weed harvester used to collect water chestnut, and for aquatic plant management pond access. A canoe rack is proposed to be installed near the boat launch.

3.1.5 Bank Stabilization

As described in an earlier section, the banks of the Res have significant areas of erosion due to normal processes from wind and water, but also due to heavy use by recreational uses who want access to the open water. Design plans to use biodegradable coir (coconut fiber) are to be used against the vertically eroded banks, with the soil backfilled behind the logs. Details are provided on the restoration site plans Sheet 4.0. For the eroded bank sections with less than 12 inches of vertical erosion one 12 inch coir log installed against the bank face is proposed. Where the vertical erosion is greater than 12 inches high, a stacked arrangement of three coir logs will be used. The coir will be held in place with duck bill earth anchors and wire. This anchoring method will not use protruding stakes which may be a hazard to young children clamoring over the bank. Coir is not permanent and has a normal life span of approximately 5 years. The coir does provide a stable bank which allows the installed native vegetation to become established and allows the roots to help permanently stabilize the shoreline.

The following table shows the total bank restoration proposed in the NOI. The Town of Arlington will conduct this work in phases, and funding permits.

6 281 of 842

Table 1. Bank Restoration

Area	Type of Erosion	Total linear feet	Estimated Restoration Planting (square feet)
Area A	High erosion >12"	2,120	31,800
Area B	Moderate erosion <12"	1,650	24,750
Area C	Stable. Planting only	130	1,950
Area D	Stable. Planting only	680	10,200
Embankment	Stable		Invasive removal only

Native trees, shrubs and emergent plant species are proposed to be used in conjunction with the bank stabilization work. The total buffer zone habitat revegetation enhancement is 68,700 square feet. Restoration Plan Sheet 5.0 includes a list of the proposed revegetation planting plan to be implemented. We anticipate that the restoration of the bank and adjacent habitat will be restored over time, as funding permits. The restoration plantings will follow the bank stabilization and the invasive species removal as described below. A native seed mix has been specified to restore disturbed soils in the buffer zone and shady areas adjacent to the Res.

3.1.6 Upland Habitat Restoration/Invasive Species Removal

Revegetation. Landscape plantings have been incorporated into the design plans by KZLA and these areas are shown on the site plan drawings. Sheet L4.4 incorporates the restoration using trees and shrubs to be used to revegetate the different shoreline restoration areas. Sheet L4.2A provides the plant list to be incorporated in the bathing beach and parking lot areas which includes trees, shrubs, and groundcover plantings. The revitalization of the landscape is an important aspect of this project, and the goal is to establish new shade trees, and to provide a native and attractive landscape planting to replace the older landscaping and plants in poor condition.

Invasive Species Management. The invasive plant species identified at the project site by SWCA and KZLA included the following species: multiflora rose (*Rosa multiflora*); common buckthorn (*Rhamnus cathartica*); autumn olive (*Elaeagus umbellate*); Oriental bittersweet (*Celatrus orbiculatus*); Japanese Barberry; burning bush; Black Swallowort; Japanees Knotweed and purple loosestrife (*Lythrum salicaria*). Poison ivy (*Toxicodendron radicans*), although not a listed invasive species, was observed throughout the project site and will be managed due to its potential to cause harm to recreational users. Invasive trees such as Black Locust and Norway Maple are not proposed to be cut or managed. Invasive species management will be conducted to reduce or eradicate the invasive plant species identified within the project limits. Due to the varying levels of plant maturity and presence of both herbaceous and woody invasive species, various methods of management will be utilized to provide the most effective control.

Herbaceous species such as purple loosestrife and immature woody invasive species seedlings will be managed with a foliar herbicide application. Foliar treatments will be conducted by using a low-pressure backpack sprayer or handheld sprayer to apply an herbicide solution to the leaves of the target species. All

282 of 842

foliar management will be conducted as spot treatments where individual target plants are selected for treatment. Broadcast treatments are not proposed. Foliar applications require the use of a non-ionic surfactant to provide successful control. SWCA proposes the use of a non-ionic surfactant approved for use within wetland areas for this project. For all foliar applications, a 2% solution of Rodeo (glyphosate) or 2.56 ounces of herbicide per gallon of water will be applied with 1% or 1.33 ounces of the surfactant. Following successful control of herbaceous populations and other target plants, dead invasive species material will be removed and disposed of offsite.

Target invasive trees, shrubs, and vines encountered within the project limits will be managed with cutstem herbicide treatments. Cut-stem treatments will involve the use of hand tools (chainsaws, pruners, loppers, etc.) to cut the stem or vine followed by a spray or wipe application of herbicide solution to the exposed stem surface. All cuts will be made within 6-inches of the ground and the cut material will be removed and disposed of offsite. Invasive vines such as Oriental bittersweet encountered climbing on trees will be cut and removed to the greatest extent feasible. Special care will be taken to avoid damages to the native canopy during removal. Following cutting, a 50% solution of Rodeo or 64 ounces of herbicide per gallon of water will be applied to the freshly cut surface. The herbicide solution will be applied using a handheld sprayer or a brush/swab.

All invasive species management will be conducted during the summer months while the target plants are actively growing. Treatments should be conducted between July and August of each year and should be separated by at-least two weeks. Approximately two herbicide treatments should be scheduled per season for at-least two years following initiation of project work. As regulated by the label for the products, the applicator will not apply more than 8 quarts of Rodeo per acre, per year at the project site. A marking dye will be used to help the applicators identify the treated plant materials as they are working and to minimize overspray onto non-target species during the herbicide applications.

We anticipate that the control of invasive species at the Res will be a long-term endeavor and will require multiple years to bring the invasive species population under control. We will therefore request that the Arlington and Lexington Conservation Commission along the control of upland invasive species to be part of the O&M plan and to be a non-expiring Condition. We anticipate that year end reports by the Certified Applicator will be provided to the Conservation Commissions.

3.2 Project Impacts

There are short term impacts to Inland Bank during restoration, but no long-term alteration or filling. The proposed work is ecological restoration of a degraded wetland Resource Area. We anticipate the bank restoration work will be a long-term project to be completed over multiple years and will require continuing Conditions to allow the long-term maintenance of the restored bank and vegetation.

The total area of high and moderate bank erosion is 3,770 linear feet.

3.3 Mitigation Measures

In addition to the restoration of the Bank. We estimate the restoration of the upland buffer zone to be approximately 68,700 square feet. The restoration work is anticipated to be a long-term project at the Res and will be conducted over multiple years. We will request the Conservation Commissions to issue a non-expiring Order to permit the maintenance of the buffer zone vegetation that will include revegetation and the removal of invasive species.

8 283 of 842

4 REGULATORY REVIEW

The proximity of jurisdictional resources to the project work area at the Res falls under the regulation of the WPA and its implementing regulations, the Town of Arlington Wetlands Protection Bylaw, and the Town of Lexington Wetlands Protection Bylaw. We request coordination by both Towns to issue Orders of Conditions which contain the same language as the site contractors will be working in both Arlington and Lexington to implement the beach improvement project and restoration work.

5 SUMMARY

The proposed work plan is the implementation phase and follows the initial recommendations of Phase I of the Master Plan for the Res. There are significant site improvements proposed for the recreational use of the bathing beach and play areas. The gravel parking area is proposed to be rebuilt using permeable materials to infiltrate stormwater, and to improve the water quality of the Res. Reconstruction of the walking path around the Res, and numerous infrastructure features are proposed. The eroded bank segments along the shoreline are proposed to be restored and stabilized, and invasive species are proposed to be removed, and replaced with native species.

There are no wetland resource areas which will be lost. The work within resource areas is for restoration purposes and will result in improved stormwater management, improved wildlife habitat, and a decrease in nutrients and sediment entering the Res. This NOI does not include aquatic vegetation control within the Res. Work proposed is along the Bank and Buffer Zone.

We anticipate the major infrastructure project work at the Res will be completed within the next three years, but the ecological restoration work will likely be initiated over a longer time due to funding availability. For this reason, we request the Conservation Commissions to consider issuing a 5 year Order of Conditions to allow for continued bank and buffer zone restoration work. We are also requesting the Conservation Commissions to issue non-expiring Conditions for the maintenance of the restored infrastructure, stormwater management, bank restoration, and invasive species control.

9

284 of 842

APPENDIX A

Abutter Notification



Office of the Board of Assessors Robbins Memorial Town Hall Arlington, MA 02476 (781) 316-3050 Assessors@town.arlington.ma.us

Abutters List

Date: November 12, 2020

Subject Property Address: 0-LOT LOWELL ST Arlington, MA

Subject Property ID: 61-1-4

Search Distance: 100 Feet - Conservation

The Board of Assessors certifies the names and addresses of requested parties in interest, all abutters to a single parcel within 100 feet.

Please see enclosed map for any abutting property within 100 feet that is in another city or town.

Board of Assessors



Town Boundary
Parcels
Buildings
Cemetery - Roads
Road3
Road3
Road4
Pavement Markings

MA Highways Interstate

Open Space
Town, State, or Priva
Other Town Owned

Abutting Towns

US Highway Numbered Routes

Open Space: Conservation

Recreation - Fields Courts Recreation - Fields Courts

Open Space - Minuteman I Open Space - Labels

Impervious Surface - For B
Street
Sidewalk
Street Island
Driveway
Parking Lot
Bike Path
Bike Path

Roads - For Small Scale (for Major Road Local Road Master Plan Base Map - M

Places by Category Police Station
Fire Station
Library
Library
Library
Recreation - Facilities

Abutters List

Date: November 12, 2020

Subject Property Address: 0-LOT LOWELL ST Arlington, MA

Subject Property ID: 61-1-4 Search Distance: 100 Feet

Prop ID: 61-1-3

Prop Location: 0-LOT MASS AVE Arlington, MA

Owner: TOWN OF ARLINGTON PARK

Co-Owner: Mailing Address: 730 MASS AVE

ARLINGTON, MA 02476

Prop ID: 61-1-4

Prop Location: 0-LOT MASS AVE Arlington, MA

Owner: TOWN OF ARLINGTON PARK

Co-Owner: Mailing Address: 730 MASS AVE

ARLINGTON, MA 02476

Prop ID: 61-1-5

Prop Location: 202 LOWELL ST Arlington, MA Owner: YOUNG DOUGLAS W & CATHRINE K

Co-Owner: Mailing Address: 202 LOWELL STREET ARLINGTON, MA 02474

Prop ID: 61-1-6

Prop Location: 198 LOWELL ST Arlington, MA

Owner: SCHWARTZ ELIZABETH

Co-Owner: Mailing Address: 198 LOWELL ST

ARLINGTON, MA 02474

Prop ID: 61-1-7

Prop Location: 194 LOWELL ST Arlington, MA

Owner: BULL PETER Co-Owner: DOIDGE THEA Mailing Address:

194 LOWELL STREET ARLINGTON, MA 02474

Prop ID: 61.A-10-1

Prop Location: 10 COLONIAL VILLAGE DR UNIT JI

Arlington, MA

Owner: VALLE ALISON Y

Co-Owner: Mailing Address:

10 COLONIAL VILLAGE DR #1 ARLINGTON, MA 02474

Prop ID: 61.A-10-10

Prop Location: 10 COLONIAL VILLAGE DR UNIT J10

Arlington, MA

Owner: SULLIVAN ROSEMARY T

Co-Owner: Mailing Address:

10 COLONIAL VILLAGE DR #10

ARLINGTON, MA 02474

Prop ID: 61.A-10-11

Prop Location: 10 COLONIAL VILLAGE DR UNIT J11

Arlington, MA

Owner: GILLIGAN BARBARA YEM- HANG/ TRS Co-Owner: BARBARA YEM-HANG GILLIGAN

Mailing Address:

10 COLONIAL VILLAGE DR #11

ARLINGTON, MA 02474

Prop ID: 61.A-10-12

Prop Location: 10 COLONIAL VILLAGE DR UNIT J12

Arlington, MA

Owner: BRASIL DEASSIS MORAES GUSTAVO

Co-Owner: SOARES CRISTIANE

Mailing Address:

10 COLONIAL VILLAGE DR #12

ARLINGTON, MA 02474

Prop ID: 61.A-10-2

Prop Location: 10 COLONIAL VILLAGE DR UNIT J2

Arlington, MA

Owner: IORDANIDIS ATHINA

Co-Owner: Mailing Address:

10 COLONIAL VILLAGE DR #2

ARLINGTON, MA 02474

Prop ID: 61.A-10-3

Prop Location: 10 COLONIAL VILLAGE DR UNIT J3

Arlington, MA

Owner: ROGERS BRUCE LEE

Co-Owner: LI JINYU Mailing Address: 107 PINE ST

WOBURN, MA 01801-3373

Prop ID: 61.A-10-4

Prop Location: 10 COLONIAL VILLAGE DR UNIT J4

Arlington, MA

Owner: VAN RHEENEN CONNIE

Co-Owner: Mailing Address:

38 BRADBURY STREET CAMBRIDGE, MA 02138

Prop ID: 61.A-10-5

Prop Location: 10 COLONIAL VILLAGE DR UNIT J5

Arlington, MA

Owner: ABUGOV GREGORY & VICTORIA

Co-Owner: Mailing Address: 16 ENDICOTT PL CANTON, MA 02021

288 of 842

Prop ID: 61.A-10-6

Prop Location: 10 COLONIAL VILLAGE DR UNIT J6

Arlington, MA

Owner: PINE DANIEL R

Co-Owner: Mailing Address: 51 STOWCROFT RD ARLINGTON, MA 02474

Prop ID: 61.A-10-7

Prop Location: 10 COLONIAL VILLAGE DR UNIT J7

Arlington, MA

Owner: HAN XIAOGANG & Co-Owner: DONG JENNIFER

Mailing Address: 508 LOWELL ST

LEXINGTON, MA 02420

Prop ID: 61.A-10-8

Prop Location: 10 COLONIAL VILLAGE DR UNIT J8

Arlington, MA

Owner: LIN ZHOUFANG

Co-Owner: Mailing Address:

10 COLONIAL VILLAGE DR #8 ARLINGTON, MA 02474

Prop ID: 61.A-10-9

Prop Location: 10 COLONIAL VILLAGE DR UNIT J9

Arlington, MA

Owner: CHAN MARY KAR-MI

Co-Owner: Mailing Address:

10 COLONIAL VILLAGE DR #9 ARLINGTON, MA 02474

Prop ID: 61.A-1-1

Prop Location: 1 COLONIAL VILLAGE DR UNIT A1

Arlington, MA

Owner: BAGWADIA ZUBIN ETAL TR Co-Owner: HOPE CYRUS BAGWADIA

Mailing Address: 87 OAK RIDGE TER LYNNFIELD, MA 01940

Prop ID: 61.A-1-10

Prop Location: 1 COLONIAL VILLAGE DR UNIT A10

Arlington, MA

Owner: ZHOU XIAOXIONG Co-Owner: A/K/A ZHOU FLORA

Mailing Address:

1 COLONIAL VILLAGE DR #10 ARLINGTON, MA 02474

Prop ID: 61.A-1-11

Prop Location: 1 COLONIAL VILLAGE DR UNIT A11

Arlington, MA

Owner: BARRY ELLEN J

Co-Owner: Mailing Address:

1 COLONIAL VILLAGE DR #11 ARLINGTON, MA 02474

Prop ID: 61.A-11-1

Prop Location: 11 COLONIAL VILLAGE DR UNIT K1

Arlington, MA

Owner: LOPEZ DAVID

Co-Owner: QUIROS LOURDES

Mailing Address: 146 OAKLAND ST MALDEN, MA 02148

Prop ID: 61.A-11-10

Prop Location: 11 COLONIAL VILLAGE DR UNIT K10

Arlington, MA

Owner: LOPEZ DAVID F

Co-Owner: Mailing Address: 146 OAKLAND ST MALDEN, MA 02148

Prop ID: 61.A-11-11

Prop Location: 11 COLONIAL VILLAGE DR UNIT K11

Arlington, MA

Owner: HIGGINS JAMES F

Co-Owner: Mailing Address:

4836 COMANCHE TRAIL PRESCOTT, AZ 86301

Prop ID: 61.A-11-12

Prop Location: 11 COLONIAL VILLAGE DR UNIT K12

Arlington, MA

Owner: WALKER KATHRYN R

Co-Owner: Mailing Address:

11 COLONIAL VILLAGE DR #12

ARLINGTON, MA 02474

Prop ID: 61.A-1-12

Prop Location: 1 COLONIAL VILLAGE DR UNIT A12

Arlington, MA

Owner: MA ZHOUYANG

Co-Owner: Mailing Address:

1 COLONIAL VILLAGE DR #12 ARLINGTON, MA 02474

Prop ID: 61.A-11-2

Prop Location: 11 COLONIAL VILLAGE DR UNIT K2

Arlington, MA

Owner: TIERNEY LAURA J TRUSTEE

Co-Owner: PIANTES SOUTH MIDDLESEX COUNTY

Mailing Address:

216 RANGEWAY RD UNIT 142 NORTH BILLERICA, MA 01862

Prop ID: 61.A-11-3

Prop Location: 11 COLONIAL VILLAGE DR UNIT K3

Arlington, MA

Owner: DIMILLA JULIE ELIZABETH

Co-Owner: Mailing Address:

11 COLONIAL VILLAGE DR #3

ARLINGTON, MA 02474

Prop ID: 61.A-11-4

Prop Location: 11 COLONIAL VILLAGE DR UNIT K4

Arlington, MA

Owner: TU WENHONG

Co-Owner: Mailing Address: 26 SADDLE CLUB RD LEXINGTON, MA 02420

Prop ID: 61.A-11-5

Prop Location: 11 COLONIAL VILLAGE DR UNIT K5

Arlington, MA

Owner: LOPEZ DAVID F

Co-Owner: Mailing Address: 146 OAKLAND ST MALDEN, MA 02148

Prop ID: 61.A-11-6

Prop Location: 11 COLONIAL VILLAGE DR UNIT K6

Arlington, MA

Owner: VAN MOORTEL MARJORIE

Co-Owner: Mailing Address:

11 COLONIAL VILLAGE DR #6

ARLINGTON, MA 02474

Prop ID: 61.A-11-7

Prop Location: 11 COLONIAL VILLAGE DR UNIT K7

Arlington, MA Owner: TU WENJIE

Co-Owner: Mailing Address:

11 COLONIAL VILLAGE DR #7

ARLINGTON, MA 02474

Prop ID: 61.A-11-8

Prop Location: 11 COLONIAL VILLAGE DR UNIT K8

Arlington, MA

Owner: BURKE CHARLES TR

Co-Owner: C/O HILARIE CHANDLER MGMT

Mailing Address: 19 DOONAN STREET TR OF S.R. REALTY TRUST MEDFORD, MA 02155

Prop ID: 61.A-11-9

Prop Location: 11 COLONIAL VILLAGE DR UNIT K9

Arlington, MA

Owner: VEZNAIAN MARY

Co-Owner: Mailing Address: 11 COLONIAL VILLAGE DR #9 ARLINGTON, MA 02474

Prop ID: 61.A-1-2

Prop Location: 1 COLONIAL VILLAGE DR UNIT A2

Arlington, MA

Owner: HERZBERG LORRIE

Co-Owner: Mailing Address: 1 COLONIAL VILLAGE DR #2 ARLINGTON, MA 02474 Prop ID: 61.A-12-1

Prop Location: 12 COLONIAL VILLAGE DR UNIT L1

Arlington, MA

Owner: SONAM TENZIN

Co-Owner: Mailing Address: 4 BRIDLE PATH SUDBURY, MA 01776

Prop ID: 61.A-12-10

Prop Location: 12 COLONIAL VILLAGE DR UNIT L10

Arlington, MA

Owner: SHARP JOHN D & KENNETH G/TRS

Co-Owner: 2019 CLIFFORD A SHARP

Mailing Address:

12 COLONIAL VILLAGE DR

UNIT 10

ARLINGTON, MA 02474

Prop ID: 61.A-12-11

Prop Location: 12 COLONIAL VILLAGE DR UNIT L11

Arlington, MA

Owner: MURPHY EDWARD

Co-Owner:
Mailing Address:

12 COLONIAL VILLAGE DR UNIT 11

ARLINGTON, MA 02474

Prop ID: 61.A-12-12

Prop Location: 12 COLONIAL VILLAGE DR UNIT L12

Arlington, MA

Owner: BAI DONGFANG Co-Owner: FEI XINGYUAN

Mailing Address:

12 COLONIAL VILLAGE DR

APT 12

ARLINGTON, MA 02474

Prop ID: 61.A-12-2

Prop Location: 12 COLONIAL VILLAGE DR UNIT L2

Arlington, MA

Owner: LAZURE PETER B/ LIFE ESTATE

Co-Owner: Mailing Address:

12 COLONIAL VILLAGE DR

UNIT 2

ARLINGTON, MA 02474

Dron ID: 61 A 12 2

Prop ID: 61.A-12-3

Prop Location: 12 COLONIAL VILLAGE DR UNIT L3

Arlington, MA

Owner: DAY STEVEN J

Co-Owner: Mailing Address:

12 COLONIAL VILLAGE DR #3

ARLINGTON, MA 02474

Prop ID: 61.A-12-4

Prop Location: 12 COLONIAL VILLAGE DR UNIT L4

Arlington, MA

Owner: JONES MARILYN J & RICHARD C/TRS

Co-Owner: JONES 2020 FAMILY TRUST

Mailing Address: 225 PHEASANT AVE ARLINGTON, MA 02474

Prop ID: 61.A-12-5

Prop Location: 12 COLONIAL VILLAGE DR UNIT L5

Arlington, MA

Owner: MORILLO-TAYLOR LILIANA

Co-Owner: Mailing Address: 2675 MONTROSE PL

SANTA BARBARA, CA 93105

Prop ID: 61.A-12-6

Prop Location: 12 COLONIAL VILLAGE DR UNIT L6

Arlington, MA

Owner: KUNWAR CHHABINDRA Co-Owner: KUNWAR SUSHMA

Mailing Address:

12 COLONIAL VILLAGE DR #6 ARLINGTON, MA 02474

Prop ID: 61.A-12-7

Prop Location: 12 COLONIAL VILLAGE DR UNIT L7

Arlington, MA

Owner: MISAWA TAKAKO

Co-Owner: Mailing Address:

12 COLONIAL VILLAGE DR #7 ARLINGTON, MA 02474

Prop ID: 61.A-12-8

Prop Location: 12 COLONIAL VILLAGE DR UNIT L8

Arlington, MA

Owner: PIRNIA SHAHRZAD

Co-Owner: Mailing Address: 21409 DAVIS MILL RD GERMANTOWN, MD 20876

Prop ID: 61.A-12-9

Prop Location: 12 COLONIAL VILLAGE DR UNIT L9

Arlington, MA

Owner: FERREIRA JOYCE P

Co-Owner: Mailing Address:

12 COLONIAL VILLAGE DR #9

ARLINGTON, MA 02474

Prop ID: 61.A-1-3

Prop Location: 1 COLONIAL VILLAGE DR UNIT A3

Arlington, MA

Owner: FARINO CARLOS

Co-Owner: FARINO-VIDAL ZORAYDA

Mailing Address: 4 SYLVIA ST

LEXINGTON, MA 02421

Prop ID: 61.A-1-4

Prop Location: 1 COLONIAL VILLAGE DR UNIT A4

Arlington, MA Owner: HE JIANG

Co-Owner: YAO TIANQING

Mailing Address:

1 COLONIAL VILLAGE DR

#4

ARLINGTON, MA 02474

Prop ID: 61.A-1-5

Prop Location: 1 COLONIAL VILLAGE DR UNIT A5

Arlington, MA Owner: WU DAI Co-Owner: Mailing Address:

1 COLONIAL VILLAGE DR #5 ARLINGTON, MA 02474

Prop ID: 61.A-1-6

Prop Location: 1 COLONIAL VILLAGE DR UNIT A6

Arlington, MA

Owner: CARSER DIANE L

Co-Owner: Mailing Address:

1 COLONIAL VILLAGE DR #6 ARLINGTON, MA 02474

Prop ID: 61.A-1-7

Prop Location: 1 COLONIAL VILLAGE DR UNIT A7

Arlington, MA

Owner: ISMAYLOV DMITRIY

Co-Owner: Mailing Address: 48 SHADY HILL RD WESTON, MA 02493

Prop ID: 61.A-1-8

Prop Location: 1 COLONIAL VILLAGE DR UNIT A8

Arlington, MA

Owner: WANG PINGLANG & YING

Co-Owner: Mailing Address: 35 SKYLINE DR

STATEN ISLAND, NY 10304

Prop ID: 61.A-1-9

Prop Location: 1 COLONIAL VILLAGE DR UNIT A9

Arlington, MA

Owner: SABIO DARIO R & JOSEFINA B/TRS Co-Owner: SABIO FMLY REVOCABLE LIVING TR

Mailing Address: 10598 SANTERNO ST LAS VEGAS, NV 89141

Prop ID: 61.A-2-1

Prop Location: 2 COLONIAL VILLAGE DR UNIT B1

Arlington, MA

Owner: DONG JENNIFER Q Co-Owner: HAN XIAOGANG

Mailing Address: 508 LOWELL ST

LEXINGTON, MA 02420

Prop ID: 61.A-2-10

Prop Location: 2 COLONIAL VILLAGE DR UNIT B10

Arlington, MA

Owner: TAM THOMAS & Co-Owner: TAM WINNIE YIN

Mailing Address:

25 WINCHESTER DRIVE LEXINGTON, MA 02420

Prop ID: 61.A-2-11

Prop Location: 2 COLONIAL VILLAGE DR UNIT B11

Arlington, MA

Owner: RAMSAY RAYLENE L

Co-Owner: Mailing Address:

2 COLONIAL VILLAGE DR #11

ARLINGTON, MA 02474

Prop ID: 61.A-2-12

Prop Location: 2 COLONIAL VILLAGE DR UNIT B12

Arlington, MA

Owner: TANO YUKI NOBU

Co-Owner: Mailing Address:

2 COLONIAL VILLAGE DR #12

ARLINGTON, MA 02474

Prop ID: 61.A-2-2

Prop Location: 2 COLONIAL VILLAGE DR UNIT B2

Arlington, MA

Owner: SQUIRES PROPERTIES LLC

Co-Owner: Mailing Address:

344 BISHOPS FOREST DR WALTHAM, MA 02452

Prop ID: 61.A-2-3

Prop Location: 2 COLONIAL VILLAGE DR UNIT B3

Arlington, MA

Owner: BERGMAN BRUCE L

Co-Owner: Mailing Address:

2 COLONIAL VILLAGE DR #3 ARLINGTON, MA 02474

Prop ID: 61.A-2-4

Prop Location: 2 COLONIAL VILLAGE DR UNIT B4

Arlington, MA

Owner: LEDDY WILLIAM A

Co-Owner: Mailing Address:

2 COLONIAL VILLAGE DR #4 ARLINGTON, MA 02474

Prop ID: 61.A-2-5

Prop Location: 2 COLONIAL VILLAGE DR UNIT B5

Arlington, MA

Owner: ZHANG YUANYE Co-Owner: HAO XINMING

Mailing Address: 60 ALBEMARLE AVE LEXINGTON, MA 02420 Prop ID: 61.A-2-6

Prop Location: 2 COLONIAL VILLAGE DR UNIT B6

Arlington, MA

Owner: MORONEY KEVIN F & PAUL R/TRS Co-Owner: MORONEY FAMILY REALTY TRUST

Mailing Address:

2 COLONIAL VILLAGE DR #6 ARLINGTON, MA 02474

Prop ID: 61.A-2-7

Prop Location: 2 COLONIAL VILLAGE DR UNIT B7

Arlington, MA

Owner: QUAN SUSAN

Co-Owner: Mailing Address: 67 SLADE ST

BELMONT, MA 02478

Prop ID: 61.A-2-8

Prop Location: 2 COLONIAL VILLAGE DR UNIT B8

Arlington, MA

Owner: WANG ROBERT T & KATHY K/TRS

Co-Owner: WANG REALTY TRUST

Mailing Address: 402 HEATHER DR LYNNFIELD, MA 01940

Prop ID: 61.A-2-9

Prop Location: 2 COLONIAL VILLAGE DR UNIT B9

Arlington, MA

Owner: WANG LIANGYUN

Co-Owner: Mailing Address:

75 SAINT ALPHONSUS ST BOSTON, MA 02120

Prop ID: 61.A-3-1

Prop Location: 3 COLONIAL VILLAGE DR UNIT C1

Arlington, MA

Owner: COSTA MARIA C

Co-Owner: Mailing Address: 39 BENTON RD

SOMERVILLE, MA 02143

Prop ID: 61.A-3-10

Prop Location: 3 COLONIAL VILLAGE DR UNIT C10

Arlington, MA

Owner: CRONIN WILLIAM E JR

Co-Owner: Mailing Address: 327 LOWELL ST

LEXINGTON, MA 02420

Prop ID: 61.A-3-11

Prop Location: 3 COLONIAL VILLAGE DR UNIT C11

Arlington, MA

Owner: KINIRY JOHN J JR

Co-Owner: Mailing Address:

3 COLONIAL VILLAGE DR #11

ARLINGTON, MA 02474

Prop ID: 61.A-3-12

Prop Location: 3 COLONIAL VILLAGE DR UNIT C12

Arlington, MA

Owner: DITROIA ELIZABETH

Co-Owner: Mailing Address:

3 COLONIAL VILLAGE DR # 12

ARLINGTON, MA 02474

Prop ID: 61.A-3-2

Prop Location: 3 COLONIAL VILLAGE DR UNIT C2

Arlington, MA

Owner: BENNETT FREDERICK

Co-Owner: BENNETT YUAN WEI MARY

Mailing Address:

3 COLONIAL VILLAGE DR #2 ARLINGTON, MA 02474

Prop ID: 61.A-3-3

Prop Location: 3 COLONIAL VILLAGE DR UNIT C3

Arlington, MA

Owner: LEE RICHARD

Co-Owner: Mailing Address:

3 COLONIAL VILLAGE DR #3 ARLINGTON, MA 02474

Prop ID: 61.A-3-4

Prop Location: 3 COLONIAL VILLAGE DR UNIT C4

Arlington, MA

Owner: ARLINGTON COLONIAL LLC

Co-Owner: Mailing Address: 26 SADDLE CLUB RD LEXINGTON, MA 02420

Prop ID: 61.A-3-5

Prop Location: 3 COLONIAL VILLAGE DR UNIT C5

Arlington, MA

Owner: FENG DUANSI

Co-Owner: Mailing Address:

3 COLONIAL VILLAGE DR #5 ARLINGTON, MA 02474

Prop ID: 61.A-3-6

Prop Location: 3 COLONIAL VILLAGE DR UNIT C6

Arlington, MA

Owner: THAMES THOMAS L Co-Owner: THAMES ELLEN M

Mailing Address:

3 COLONIAL VILLAGE DR #6 ARLINGTON, MA 02474

Prop ID: 61.A-3-7

Prop Location: 3 COLONIAL VILLAGE DR UNIT C7

Arlington, MA

Owner: CAMERON MELANIE

Co-Owner: Mailing Address: 9 PRINCETON ROAD ARLINGTON, MA 02474 Prop ID: 61.A-3-8

Prop Location: 3 COLONIAL VILLAGE DR UNIT C8

Arlington, MA

Owner: WANG ROBERT T & KATHY K/TRS

Co-Owner: WANG REALTY TRUST

Mailing Address: 402 HEATHER RD LYNNFIELD, MA 01940

Prop ID: 61.A-3-9

Prop Location: 3 COLONIAL VILLAGE DR UNIT C9

Arlington, MA

Owner: LARSEN DAVID L

Co-Owner: Mailing Address:

14 WESTERN AVE UNIT 2 GLOUCESTER, MA 01930

Prop ID: 61.A-4-1

Prop Location: 4 COLONIAL VILLAGE DR UNIT D1

Arlington, MA

Owner: JUNG JONATHAN

Co-Owner: Mailing Address:

4 COLONIAL VILLAGE DR #1 ARLINGTON, MA 02474

Prop ID: 61.A-4-10

Prop Location: 4 COLONIAL VILLAGE DR UNIT D10

Arlington, MA

Owner: THOMPSON JOHN R & JUDITH

Co-Owner: Mailing Address: 20 CONNOLLY RD BILLERICA, MA 01821

Prop ID: 61.A-4-11

Prop Location: 4 COLONIAL VILLAGE DR UNIT D11

Arlington, MA

Owner: ONEIL EMILY

Co-Owner: Mailing Address:

4 COLONIAL VILLAGE DR #11 ARLINGTON, MA 02474

Prop ID: 61.A-4-12

Prop Location: 4 COLONIAL VILLAGE DR UNIT D12

Arlington, MA

Owner: COMMONWEALTH BOSTON REALTY LLC

Co-Owner: Mailing Address:

111 PERKINS STREET #192 JAMAICA PLAIN, MA 02130

Prop ID: 61.A-4-2

Prop Location: 4 COLONIAL VILLAGE DR UNIT D2

Arlington, MA

Owner: COLONIAL VILLAGE CONDOMINIUM

Co-Owner: TRUST Mailing Address:

C/O DEPT 368 FIRST REALTY MANAGEMENT COR PO BOX 4579

HOUSTON, TX 77210-4579

Prop ID: 61.A-4-3

Prop Location: 4 COLONIAL VILLAGE DR UNIT D3

Arlington, MA

Owner: JOHNSON CARL R

Co-Owner: Mailing Address: 75 WILSON RD BEDFORD, MA 01730

DEDI OND, III (0) . Go

Prop ID: 61.A-4-4

Prop Location: 4 COLONIAL VILLAGE DR UNIT D4

Arlington, MA

Owner: SHIEH TONY TUNG HSIEN

Co-Owner: CHAN WING CHI

Mailing Address: 50 CHANDLER RD BURLINGTON, MA 01803

Prop ID: 61.A-4-5

Prop Location: 4 COLONIAL VILLAGE DR UNIT D5

Arlington, MA

Owner: JENNINGS LAURIE/TRUSTEE

Co-Owner: SANDRA L FJELD 2017 IRREVOCABL

Mailing Address:

4 COLONIAL VILLAGE DR #5 ARLINGTON, MA 02474

Prop ID: 61.A-4-6

Prop Location: 4 COLONIAL VILLAGE DR UNIT D6

Arlington, MA

Owner: MANANDHAR ANILA

Co-Owner: Mailing Address: 2 ST MARY'S RD

BURLINGTON, MA 01803

Prop ID: 61.A-4-7

Prop Location: 4 COLONIAL VILLAGE DR UNIT D7

Arlington, MA

Owner: PHAM GIANG T M

Co-Owner: Mailing Address:

4 COLONIAL VILLAGE DR #7 ARLINGTON, MA 02474

Prop ID: 61.A-4-8

Prop Location: 4 COLONIAL VILLAGE DR UNIT D8

Arlington, MA
Owner: XIE CHAO
Co-Owner: YAN MINGLI
Mailing Address:
47 SOMERSET RD

LEXINGTON, MA 02420

Prop ID: 61.A-4-9

Prop Location: 4 COLONIAL VILLAGE DR UNIT D9

Arlington, MA

Owner: KIM MYUNG HEE

Co-Owner: Mailing Address:

131 COOLIDGE AVE UNIT 128 WATERTOWN, MA 02472-2847

Prop ID: 61.A-5-1

Prop Location: 5 COLONIAL VILLAGE DR UNIT E1

Arlington, MA

Owner: LEXINGTON REALTY HOLDINGS LLC

Co-Owner: Mailing Address: PO BOX 134

LEXINGTON, MA 02420

Prop ID: 61.A-5-10

Prop Location: 5 COLONIAL VILLAGE DR UNIT E10

Arlington, MA

Owner: OCALLAGHAN KELLY & Co-Owner: SCHNEIDER BRENDYN

Mailing Address:

5 COLONIAL VILLAGE DR #10 ARLINGTON, MA 02474

Prop ID: 61.A-5-11

Prop Location: 5 COLONIAL VILLAGE DR UNIT E11

Arlington, MA
Owner: CHENG HUI
Co-Owner: WANG HUI
Mailing Address:

5 COLONIAL VILLAGE DR #11 ARLINGTON, MA 02474

Prop ID: 61.A-5-12

Prop Location: 5 COLONIAL VILLAGE DR UNIT E12

Arlington, MA

Owner: HUANG GRACE

Co-Owner: Mailing Address:

5 COLONIAL VILLAGE DR #12 ARLINGTON, MA 02476

Prop ID: 61.A-5-2

Prop Location: 5 COLONIAL VILLAGE DR UNIT E2

Arlington, MA

Owner: COLARUSSO PROPERTIES LLC

Co-Owner: Mailing Address: 22 MILL ST SUITE 305 ARLINGTON, MA 02476

Prop ID: 61.A-5-3

Prop Location: 5 COLONIAL VILLAGE DR UNIT E3

Arlington, MA

Owner: SMITH IRENE H

Co-Owner: Mailing Address:

5 COLONIAL VILLAGE DR #3 ARLINGTON, MA 02474

Prop ID: 61.A-5-4

Prop Location: 5 COLONIAL VILLAGE DR UNIT E4

Arlington, MA

Owner: JAIN SUJIT G

Co-Owner: GOLECHA PRATIBHA S

Mailing Address:

30 APPLETON PL UNIT 2 ARLINGTON, MA 02476

Prop ID: 61.A-5-5

Prop Location: 5 COLONIAL VILLAGE DR UNIT E5

Arlington, MA

Owner: WU PHILIP C

Co-Owner: Mailing Address:

10 BROADWAY PL APT 3 SOMERVILLE, MA 02145

Prop ID: 61.A-5-6

Prop Location: 5 COLONIAL VILLAGE DR UNIT E6

Arlington, MA

Owner: GROSS GERALDINE R

Co-Owner: Mailing Address:

5 COLONIAL VILLAGE DR #6 ARLINGTON, MA 02474

Prop ID: 61.A-5-7

Prop Location: 5 COLONIAL VILLAGE DR UNIT E7

Arlington, MA

Owner: AHMARI SOHRAB

Co-Owner: Mailing Address:

5 COLONIAL VILLAGE DR #7 ARLINGTON, MA 02474

Prop ID: 61.A-5-8

Prop Location: 5 COLONIAL VILLAGE DR UNIT E8

Arlington, MA

Owner: MASKEY ANURAG Co-Owner: SHRESTHA SHACHI

Mailing Address: 47 WALLACE ST

NEWTON HIGHLANDS, MA 02461

Prop ID: 61.A-5-9

Prop Location: 5 COLONIAL VILLAGE DR UNIT E9

Arlington, MA

Owner: LAWSON MARTHA A

Co-Owner: Mailing Address: 70 MT VERNON ST HAVERHILL, MA 01830

Prop ID: 61.A-6-1

Prop Location: 6 COLONIAL VILLAGE DR UNIT F1

Arlington, MA

Owner: MENDEZ VICTOR F

Co-Owner: Mailing Address: 11 RICHARDSON RD STONEHAM, MA 02180

Prop ID: 61.A-6-10

Prop Location: 6 COLONIAL VILLAGE DR UNIT F10

Arlington, MA

Owner: WOLFE DANIEL P

Co-Owner: Mailing Address:

6 COLONIAL VILLAGE DR #10 ARLINGTON, MA 02474

Prop ID: 61.A-6-11

Prop Location: 6 COLONIAL VILLAGE DR UNIT F11

Arlington, MA

Owner: HARRIS JEFFREY M

Co-Owner: Mailing Address:

6 COLONIAL VILLAGE DR #11 ARLINGTON, MA 02474

Prop ID: 61.A-6-12

Prop Location: 6 COLONIAL VILLAGE DR UNIT F12

Arlington, MA

Owner: LEE FONG-CHANG Co-Owner: LEE SHIU-IN Mailing Address:

C/O JOSEPH LEE 1531 LUDINGTON AVE WESLEY CHAPEL, FL 33543

Prop ID: 61.A-6-2

Prop Location: 6 COLONIAL VILLAGE DR UNIT F2

Arlington, MA

Owner: CATALDI MAUREEN

Co-Owner: Mailing Address:

6 COLONIAL VILLAGE DR UNIT 2

ARLINGTON, MA 02474

Prop ID: 61.A-6-3

Prop Location: 6 COLONIAL VILLAGE DR UNIT F3

Arlington, MA

Owner: RANNEY ROGER ERIC

Co-Owner: Mailing Address:

6 COLONIAL VILLAGE DR #3 ARLINGTON, MA 02474

Prop ID: 61.A-6-4

Prop Location: 6 COLONIAL VILLAGE DR UNIT F4

Arlington, MA

Owner: MEI KATHY XIUWEN

Co-Owner: Mailing Address: 32 ARCOLA ST

LEXINGTON, MA 02420

Prop ID: 61.A-6-5

Prop Location: 6 COLONIAL VILLAGE DR UNIT F5

Arlington, MA

Owner: SHENG JIANXIONG & Co-Owner: LIU WENYING

Mailing Address:

6 COLONIAL VILLAGE DR #5 ARLINGTON, MA 02474

Prop ID: 61.A-6-6

Prop Location: 6 COLONIAL VILLAGE DR UNIT F6

Arlington, MA

Owner: BRIGHTMAN HELEN A ETAL/TRUSTEE Co-Owner: BRIGHTMAN NOMINEE REALTY TRUST

Mailing Address:

13 EDSON ST

295 of 842 NASHUA, NH 03064

Prop ID: 61.A-6-7

Prop Location: 6 COLONIAL VILLAGE DR UNIT F7

Arlington, MA

Owner: MACAULEY LYNNE A

Co-Owner: Mailing Address:

6 COLONIAL VILLAGE DR #7 ARLINGTON, MA 02474

Prop ID: 61.A-6-8

Prop Location: 6 COLONIAL VILLAGE DR UNIT F8

Arlington, MA

Owner: ZHANG YANFANG Co-Owner: CUI JIKE Mailing Address: 78 MAPLE ST BELMONT, MA 02478

Prop ID: 61.A-6-9

Prop Location: 6 COLONIAL VILLAGE DR UNIT F9

Arlington, MA

Owner: PERKINS ELLIOTT W & ANITA C Co-Owner: TRS/ PERKINS FAMILY TRUST

Mailing Address:

17 STEEPLE CHASE CIRCLE WESTFORD, MA 01886

Prop ID: 61.A-7-1

Prop Location: 7 COLONIAL VILLAGE DR UNIT G1

Arlington, MA

Owner: LAMB MARTHA

Co-Owner: Mailing Address:

7 COLONIAL VILLAGE DR #1 ARLINGTON, MA 02474

Prop ID: 61.A-7-10

Prop Location: 7 COLONIAL VILLAGE DR UNIT G10

Arlington, MA

Owner: GIOVINAZZO EMMA

Co-Owner: Mailing Address:

7 COLONIAL VILLAGE DR #10 ARLINGTON, MA 02474

Prop ID: 61.A-7-11

Prop Location: 7 COLONIAL VILLAGE DR UNIT G11

Arlington, MA

Owner: MUSE CAROLYN M & JAMES A

Co-Owner: Mailing Address: 1 PONDEROSA DR PELHAM, NH 03076

Prop ID: 61.A-7-12

Prop Location: 7 COLONIAL VILLAGE DR UNIT G12

Arlington, MA

Owner: AUSTIN ALEXANDER B

Co-Owner: Mailing Address:

7 COLONIAL VILLAGE DR #12

ARLINGTON, MA 02474

Prop ID: 61.A-7-2

Prop Location: 7 COLONIAL VILLAGE DR UNIT G2

Arlington, MA

Owner: JANTZ JOAN E

Co-Owner: Mailing Address:

7 COLONIAL VILLAGE DR #2 ARLINGTON, MA 02474

Prop ID: 61.A-7-3

Prop Location: 7 COLONIAL VILLAGE DR UNIT G3

Arlington, MA

Owner: FARRELL MICHAEL W Co-Owner: STEIN BRITTANY T

Mailing Address:

7 COLONIAL VILLAGE DR #3 ARLINGTON, MA 02474

Prop ID: 61.A-7-4

Prop Location: 7 COLONIAL VILLAGE DR UNIT G4

Arlington, MA

Owner: MAUGEL NATHAN/JENNIFER

Co-Owner: Mailing Address: 60 MUNROE DR

EAST HAMPSTEAD, NH 03826

Prop ID: 61.A-7-5

Prop Location: 7 COLONIAL VILLAGE DR UNIT G5

Arlington, MA

Owner: SHIU PLACID K

Co-Owner: Mailing Address: 19 GRANT PL

LEXINGTON, MA 02420

Prop ID: 61.A-7-6

Prop Location: 7 COLONIAL VILLAGE DR UNIT G6

Arlington, MA

Owner: MAHER DAVID F/TRUSTEE Co-Owner: 7 COLONIAL TRUST

Mailing Address: 966 BROADWAY

SOMERVILLE, MA 02144

Prop ID: 61.A-7-7

Prop Location: 7 COLONIAL VILLAGE DR UNIT G7

Arlington, MA

Owner: SIEGEL JULES

Co-Owner: Mailing Address:

1010 WALTHAM ST APT 295 LEXINGTON, MA 02421

Prop ID: 61.A-7-8

Prop Location: 7 COLONIAL VILLAGE DR UNIT G8

Arlington, MA

Owner: ZHANG ZHENZHEN &

Co-Owner: CHEN KUN Mailing Address:

58 CRESTVIEW RD BELMONT, MA 02478

Prop ID: 61.A-7-9

Prop Location: 7 COLONIAL VILLAGE DR UNIT G9

Arlington, MA

Owner: SWARTS HEIDI

Co-Owner: Mailing Address:

7 COLONIAL VILLAGE DR #9 ARLINGTON, MA 02474

Prop ID: 61.A-8-1

Prop Location: 8 COLONIAL VILLAGE DR UNIT H1

Arlington, MA

Owner: LEXINGTON REALTY HOLDINGS LLC

Co-Owner: Mailing Address: PO BOX 134

LEXINGTON, MA 02420

Prop ID: 61.A-8-10

Prop Location: 8 COLONIAL VILLAGE DR UNIT H10

Arlington, MA

Owner: JONAS MICHAEL

Co-Owner: Mailing Address:

8 COLONIAL VILLAGE DR #10

ARLINGTON, MA 02476

Prop ID: 61.A-8-11

Prop Location: 8 COLONIAL VILLAGE DR UNIT H11

Arlington, MA

Owner: RAHMATPOUR SOHAILA--ETAL

Co-Owner: NAKHAEE HAMID

Mailing Address:

20 OVERBROOK DRIVE WELLESLEY, MA 02482

Prop ID: 61.A-8-12

Prop Location: 8 COLONIAL VILLAGE DR UNIT H12

Arlington, MA

Owner: MILLER CHERYL S

Co-Owner: Mailing Address:

8 COLONIAL VILLAGE DR #12

ARLINGTON, MA 02474

Prop ID: 61.A-8-2

Prop Location: 8 COLONIAL VILLAGE DR UNIT H2

Arlington, MA

Owner: KNIGHT WILL

Co-Owner: Mailing Address:

8 COLONIAL VILLAGE DR #2 ARLINGTON, MA 02474

Prop ID: 61.A-8-3

Prop Location: 8 COLONIAL VILLAGE DR UNIT H3

Arlington, MA

Owner: ELANBRI NOUREDDINE Co-Owner: AZMANI WAFA

Mailing Address:

8 COLONIAL VILLAGE DR #3 ARLINGTON, MA 02474 Prop ID: 61.A-8-4

Prop Location: 8 COLONIAL VILLAGE DR UNIT H4

Arlington, MA

Owner: NADJARIAN VATCHE

Co-Owner: Mailing Address:

8 COLONIAL VILLAGE DR

UNIT 4

ARLINGTON, MA 02474

Prop ID: 61.A-8-5

Prop Location: 8 COLONIAL VILLAGE DR UNIT H5

Arlington, MA

Owner: KING ALLISON J

Co-Owner: Mailing Address:

8 COLONIAL VILLAGE DR #5 ARLINGTON, MA 02474

Prop ID: 61.A-8-6

Prop Location: 8 COLONIAL VILLAGE DR UNIT H6

Arlington, MA

Owner: HUEY JEFFREY K

Co-Owner: Mailing Address:

8 COLONIAL VILLAGE DR APT 6

ARLINGTON, MA 02474

Prop ID: 61.A-8-7

Prop Location: 8 COLONIAL VILLAGE DR UNIT H7

Arlington, MA

Owner: SHEEHAN KEVIN/ANDREA

Co-Owner: Mailing Address: 228 FOX HILL RD

BURLINGTON, MA 01803

Prop ID: 61.A-8-8

Prop Location: 8 COLONIAL VILLAGE DR UNIT H8

Arlington, MA

Owner: RUSSO ANMARIE

Co-Owner: Mailing Address:

8 COLONIAL VILLAGE DR #8

ARLINGTON, MA 02474

Prop ID: 61.A-8-9

Prop Location: 8 COLONIAL VILLAGE DR UNIT H9

Arlington, MA Owner: LIU QING

Co-Owner: LI SHUANGLIAN

Mailing Address:

8 COLONIAL VILLAGE DR #9 ARLINGTON, MA 02474

Prop ID: 61.A-9-1

Prop Location: 9 COLONIAL VILLAGE DR UNIT I1

Arlington, MA

Owner: GOODWIN DESIREE

Co-Owner: Mailing Address:

9 COLONIAL VILLAGE DR #1

ARLINGTON, MA 02474

Prop ID: 61.A-9-10

Prop Location: 9 COLONIAL VILLAGE DR UNIT I10

Arlington, MA

Owner: PRESTON DIANE

Co-Owner: Mailing Address: 186 NEWPORT ST ARLINGTON, MA 02476

Prop ID: 61.A-9-11

Prop Location: 9 COLONIAL VILLAGE DR UNIT 111

Arlington, MA

Owner: VALDETTARO VERONIQUE A

Co-Owner: Mailing Address:

9 COLONIAL VILLAGE DR #11 ARLINGTON, MA 02474

Prop ID: 61.A-9-12

Prop Location: 9 COLONIAL VILLAGE DR UNIT 112

Arlington, MA

Owner: FLEMING ELLEN T

Co-Owner: Mailing Address:

9 COLONIAL VILLAGE DR #12 ARLINGTON, MA 02474

Prop ID: 61.A-9-2

Prop Location: 9 COLONIAL VILLAGE DR UNIT 2

Arlington, MA

Owner: NEWMARK GERRY G

Co-Owner: Mailing Address:

9 COLONIAL VILLAGE DR #2 ARLINGTON, MA 02474

Prop ID: 61.A-9-3

Prop Location: 9 COLONIAL VILLAGE DR UNIT 13

Arlington, MA

Owner: ELBANNAN SAMAA

Co-Owner: Mailing Address: 39 PINE HILL RD BEDFORD, MA 01730

Prop ID: 61.A-9-4

Prop Location: 9 COLONIAL VILLAGE DR UNIT 14

Arlington, MA

Owner: DONOVAN JOANNE

Co-Owner: Mailing Address:

9 COLONIAL VILLAGE DR #14

ARLINGTON, MA 02474

Prop ID: 61.A-9-5

Prop Location: 9 COLONIAL VILLAGE DR UNIT 15

Arlington, MA

Owner: LAI RALPH W M & CINDY S T

Co-Owner: Mailing Address: 28 CORNERSTO

28 CORNERSTONE CT DOYLESTOWN, PA 18901 Prop ID: 61.A-9-6

Prop Location: 9 COLONIAL VILLAGE DR UNIT 16

Arlington, MA

Owner: WANG PINGLANG & YING

Co-Owner: Mailing Address: 35 SKYLINE DR

STATEN ISLAND, NY 10304

Prop ID: 61.A-9-7

Prop Location: 9 COLONIAL VILLAGE DR UNIT 17

Arlington, MA

Owner: ZHANG YANFANG &

Co-Owner: CUI JIKE Mailing Address: 78 MAPLE ST

BELMONT, MA 02478

Prop ID: 61.A-9-8

Prop Location: 9 COLONIAL VILLAGE DR UNIT 18

Arlington, MA

Owner: SHINGU IKUE

Co-Owner: Mailing Address:

9 COLONIAL VILLAGE DR #8 ARLINGTON, MA 02474

Prop ID: 61.A-9-9

Prop Location: 9 COLONIAL VILLAGE DR UNIT 19

Arlington, MA

Owner: MAC INNES PATRICIA

Co-Owner: Mailing Address: 32 ST CATHERINE RD NORWOOD, MA 02062

Prop ID: 62-1-4.A

Prop Location: 16-38 DRAKE RD Arlington, MA Owner: ARLINGTON HOUSING AUTHORITY

Co-Owner: DRAKE VILLAGE

Mailing Address: 730 MASS AVE

ARLINGTON, MA 02476

Prop ID: 85-1-7

Prop Location: 4 WESTMORELAND AVE Arlington, MA

Owner: CALLAGHAN OWEN & JESSICA

Co-Owner: Mailing Address:

4 WESTMORELAND AVE ARLINGTON, MA 02474

Prop ID: 85-1-8

Prop Location: 239 LOWELL ST Arlington, MA

Owner: VERDERESE JOHN T

Co-Owner: Mailing Address:

239 LOWELL STREET ARLINGTON, MA 02474

Prop ID: 85-1-9

Prop Location: 243 LOWELL ST Arlington, MA

Owner: WYATT PATRICIA L

Co-Owner: Mailing Address: 243 LOWELL STREET ARLINGTON, MA 02474

Prop ID: 85-4-14

Prop Location: 3 WESTMORELAND AVE Arlington, MA

Owner: ENG DAVID H

Co-Owner: CANTY ANDREA M

Mailing Address:

3 WESTMORELAND AVE ARLINGTON, MA 02474

Prop ID: 85-4-15

Prop Location: 221 LOWELL ST Arlington, MA

Owner: LAMONT STUART & BARBARA

Co-Owner: Mailing Address: 221 LOWELL STREET ARLINGTON, MA 02474

Prop ID: 85-4-16

Prop Location: 219 LOWELL ST Arlington, MA

Owner: SMITH ROBERT G & JANE R

Co-Owner: Mailing Address: 219 LOWELL STREET ARLINGTON, MA 02474

Prop ID: 85-4-21

Prop Location: 7 WEST COURT TERR Arlington, MA

Owner: STROK GAVIN M

Co-Owner: STROK MARIE-CAROLINE

Mailing Address: 7 WEST COURT TERR ARLINGTON, MA 02474

Prop ID: 85-4-22

Prop Location: 207 LOWELL ST Arlington, MA

Owner: MARTENS CHINA L

Co-Owner: MARTENS SIEGFRIED

Mailing Address: 207 LOWELL STREET ARLINGTON, MA 02474

Prop ID: 85-4-23

Prop Location: 203 LOWELL ST Arlington, MA

Owner: SALOCKS JEFFREY D--ETAL Co-Owner: STAFFORD SHARON L

Mailing Address: 203 LOWELL STREET ARLINGTON, MA 02474

Prop ID: 85-4-26

Prop Location: 197 LOWELL ST Arlington, MA Owner: GETTLER JUSTIN B & HOLLY K

Co-Owner: Mailing Address: 197 LOWELL ST ARLINGTON, MA 02474 Prop ID: 86-5-10.A

Prop Location: 255 LOWELL ST Arlington, MA

Owner: GALVIN ANNE M

Co-Owner: Mailing Address: 255 LOWELL ST

ARLINGTON, MA 02474

Prop ID: 86-5-10.B

Prop Location: 0-LOT LOWELL ST Arlington, MA

Owner: PLANT SUSAN W Co-Owner: CHO DANYUL Y

Mailing Address: 257 LOWELL STREET ARLINGTON, MA 02474

Prop ID: 86-5-11

Prop Location: 257 LOWELL ST Arlington, MA

Owner: PLANT SUSAN W Co-Owner: CHO DANYUL Y

Mailing Address: 257 LOWELL STREET ARLINGTON, MA 02474

Prop ID: 86-5-12

Prop Location: 261 LOWELL ST Arlington, MA

Owner: SOUCY PAUL EDWARD Co-Owner: SILVERMAN MELANIE TIA

Mailing Address: 261 LOWELL STREET ARLINGTON, MA 02474

Prop ID: 86-5-13

Prop Location: 265 LOWELL ST Arlington, MA Owner: CHARLIER-MATTHEWS REBECCA Co-Owner: KOSMATKA KRISTOPHER

Mailing Address: 265 LOWELL ST

ARLINGTON, MA 02474

Prop ID: 86-5-14

Prop Location: 269 LOWELL ST Arlington, MA

Owner: CANADAY JOHN T

Co-Owner: Mailing Address: 269 LOWELL ST

ARLINGTON, MA 02474

Prop ID: 86-5-15

Prop Location: 271 LOWELL ST Arlington, MA

Owner: GEISSLER GARY J

Co-Owner: Mailing Address: 1 LOWELL STREET LEXINGTON, MA 02420

Prop ID: 86-5-9

Prop Location: 251 LOWELL ST Arlington, MA

Owner: ALLEN THOMAS J &

Co-Owner: SENESE MARGARET D

Mailing Address:

251 LOWELL STREET ARLINGTON, MA 02474

Notification to Abutters Under the Massachusetts Wetlands Protection Act and Arlington Wetlands Protection Bylaw

In accordance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, and the Arlington Wetlands Protection Bylaw, you are hereby notified of the following:

The Conservation Commission will hold a public hearing on Thursday, December 17, 2020 at 7:30pm in accordance with the provisions of the Mass. Wetlands Protection Act (M.G.L. Ch. 131, s. 40, as amended) and the Town of Arlington By-Laws Article 8, By-Law for Wetland Protection, for a Notice of Intent from the Town of Arlington Parks & Recreation Commission, for the Arlington Reservoir Renovation Project Phase II, which includes parking area improvements, installation of new ADA-accessible pathways, new recreational facilities, a boat launch, bathing beach improvements, bank stabilization measures, and invasive species control / upland habitat restoration at the Arlington Reservoir, within regulated wetland resource areas and buffer zones, on Assessor's Property Map/Lot 61-1-4 in Arlington. *Due to COVID-19, please refer to the town website for information on the location of the meeting or virtual (Zoom) meeting information. Conservation Commission agendas are posted on their website at least 48 hours in advance at: https://www.arlingtonma.gov/town-governance/boards-and-committees/conservation-commission.*

A copy of the application and accompanying plans are available for inspection Mon. - Fri. 8am-noon at the Conservation Commission office, first floor of the Town Hall Annex, 730 Massachusetts Avenue and by request via email at Rebecca.weissman@swca.com. (Please note that the town hall may be closed or office hours reduced due to COVID-19 concerns).

For more information call the Town of Arlington Parks and Recreation Commission at 781-316-3880 or the Arlington Conservation Commission at 781-316-3012, or the DEP Northeast Regional Office, 978-694-3200.

NOTE: Notice of the Public Hearing will be published at least five (5) days in advance in *The Arlington Advocate* and be posted not less than 48 hours in advance in the Arlington Town Hall of the public hearing.

AFFIDAVIT OF SERVICE

(Return to Conservation Commission)

I, Becky Barber, being duly sworn, do hereby state as follows: on December 3, 2020, I mailed a "Notification to Abutters" in compliance with the second paragraph of Massachusetts General Laws, Chapter 131, s.40, the DEP Guide to Abutter Notification dated April 8, 1994, and the Arlington Wetlands Protection Bylaw, Title V, Article 8 of the Town of Arlington Bylaws in connection with the following matter: A Notice of Intent

The form of the notification, and a list of the abutters to whom it was provided and their addresses, are attached to this Affidavit of Service. Signed under the pains and penalties of perjury, this 3rd day of December, 2020.

Name

Becky Barber

APPENDIX B

Figures





APPENDIX C

Site Photographs

All photographs taken July 17, 2020

Photo 1: Bathing Beach



Photo 2. Swim Area with Embankment on left.



Photo 3. Embankment. The surface is proposed to be improved for walking, and invasive species, including poison ivy to be removed.



All photographs taken July 17, 2020

Photo 4: Existing gravel parking lot. It is proposed to rebuild the parking lot with permeable materials to improve water quality in the Res.



Photo 5. Bank and slope erosion from parking lot overland runoff. The banks are proposed to be restored, and the stormwater will be infiltrated.



Photo 6. Typical bank and slope erosion along the Res. These areas are proposed to be restored and re-vegetated.



All photographs taken July 17, 2020

Photo 7: Existing Walking Path in Arlington proposed to be rebuilt and the adjacent bank/slopes restored.



Photo 8. Existing walking path in Lexington. Vegetation is dominated by invasive species proposed to be controlled.



Photo 9. Areas of significant bank erosion are proposed to be restored in the first phase of site work (west side of Res near Rindge Park).



APPENDIX D

Project Plans (Under Separate Cover)

A-1 309 of 842

APPENDIX E

Stormwater Report (Under Separate Cover)

A-1 310 of 842

TOWN OF ARLINGTON

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

100% DESIGN DEVELOPMENT SET

DRAWING LIST

G COVER SHEET
LO KEY PLAN
L1.1 - L1.5 SITE PREPARATION AND DEMO PLANS
L2.1 - L2.5 LAYOUT AND MATERIAL PLANS
L3.1 - L3.5 GRADING PLANS
L4.1 - L4.5 PLANTING PLANS
LD1.1 - LD1.9 LANDSCAPE DETAILS
C1.0 CIVIL DRAINAGE PLAN
C2.0 CIVIL DETAIL SHEETS
1.0 PROPOSED BANK RESTORATION AREAS
2.0 PROPOSED AREAS OF PHASE1 BANK RESTORATION
3.0 BANK RESTORATION SECTIONS

BANK RESTORATION DETAILS

BANK RESTORATION DETAILS AND NOTES

PREPARED BY:

LANDSCAPE ARCHITECT:

Kyle Zick Landscape Architecture, Inc.

36 Bromfield Street, Suite 202

Boston, MA 02108 617-451-1018 Tel www. kylezick.com

ARCHITECT:

Bargmann Hendrie + Archetype, Inc.

9 Channel Center Street #300, Boston, MA 02210 617-350-0450 Tel 617-350-0215 Fax

CIVIL ENGINEER:

Woodard & Curran, Inc.

980 Washington Street #325, Dedham, MA 02026 800-446-5518 Tel

ENVIRONMENTAL CONSULTING:

SWCA Environmental Consultants

15 Research Drive, Amherst, MA 01002 413-575-9883 Tel

ARINGTONS
GREAT
HEADOWS

ARINGTON
HIT GIBOA
HI

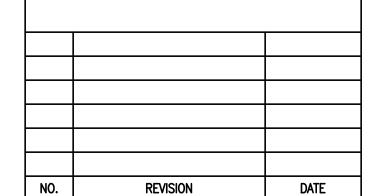
Lowell Street/Arlington Reservoir

Arlington, MA

ARLINGTON RESERVOIR -PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON



KZla

Kyle Zick Landscape Architecture, Inc.
36 Bromfield Street Suite 202 617 451Boston, MA 02108 www.kyle



100% DESIGN DEVELOPMENT SET

Job Number:

Project: ARLINGTON RE

Drawn By: JL/MD/RB C

Date: NOVEMBER 13, 2020

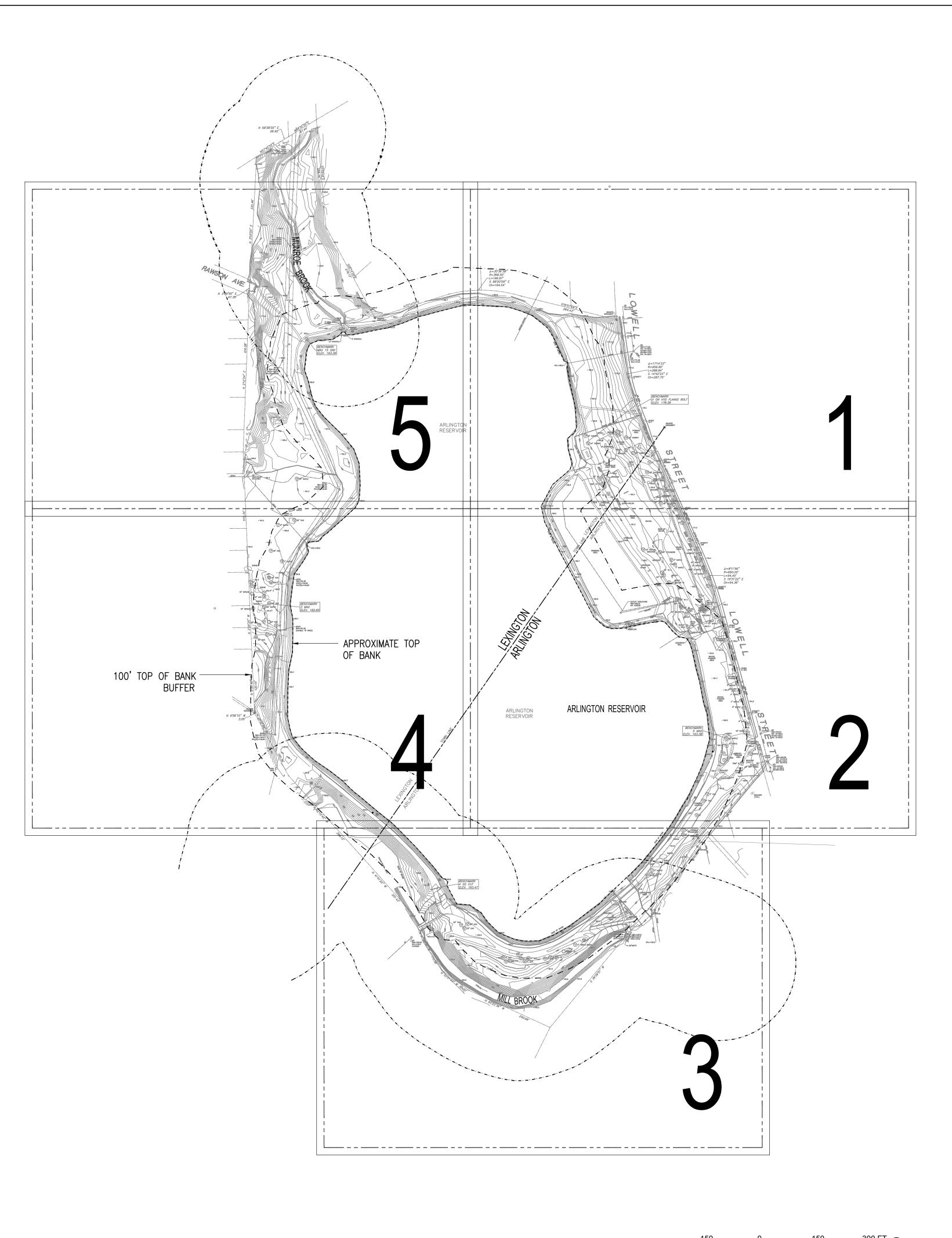
S t

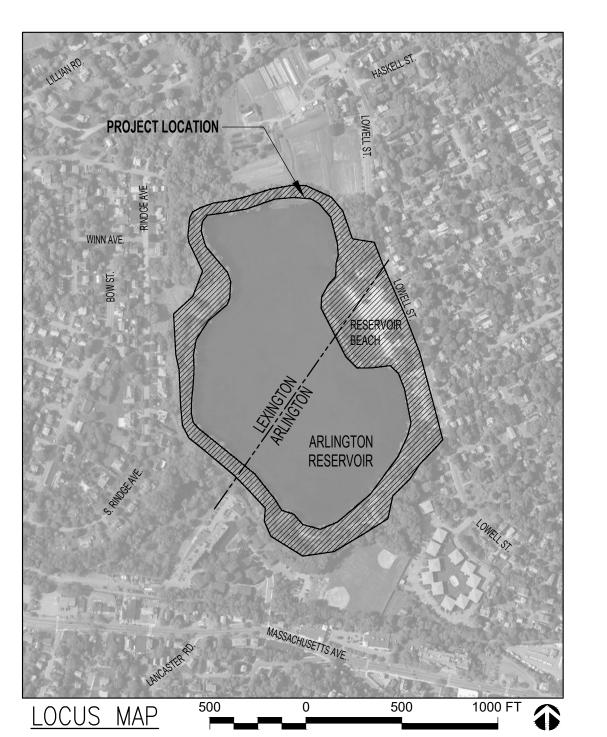
Drawing Title:

•

COVER SHEET

G





GENERAL NOTES:

- CONTRACTOR SHALL BE FAMILIAR WITH DRAWINGS AND SPECIFICATIONS BEFORE BIDDING
 DRAWINGS SHALL SUPERSEDE SPECIFICATIONS FOR ANY
- 3. CONTRACTOR SHALL CONFORM TO ALL FEDERAL, STATE AND LOCAL CODES, INCLUDING CMR521/ADA.
- 4. NO SMOKING IS ALLOWED WITHIN THE PARK AT ANY TIME 5. SURVEY WAS PERFORMED BY WESTON & SAMPSON ENGINEERS, INC. OF ALBANY, NY WAS UNDERTAKEN IN
- DECEMBER 2017 6. PER THE STORMWATER POLLUTION PREVENTION PLAN (DATED 11/9/2020), THE CONTRACTOR CAN NOT DISTURB MORE THAN 5 ACRES AT ANY GIVEN TIME.

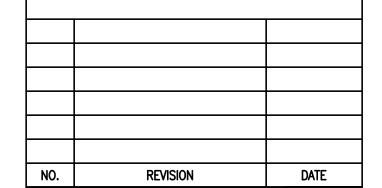
<u>LEGEND</u>

----- APPROXIMATE TOP OF BANK ----- 200' RIVERFRONT AREA

ARLINGTON RESERVOIR -PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON



Kyle Zick Landscape Architecture, Inc. 36 Bromfield Street Suite 202 617 451-1018 Tel Boston, MA 02108 www.kylezick.com

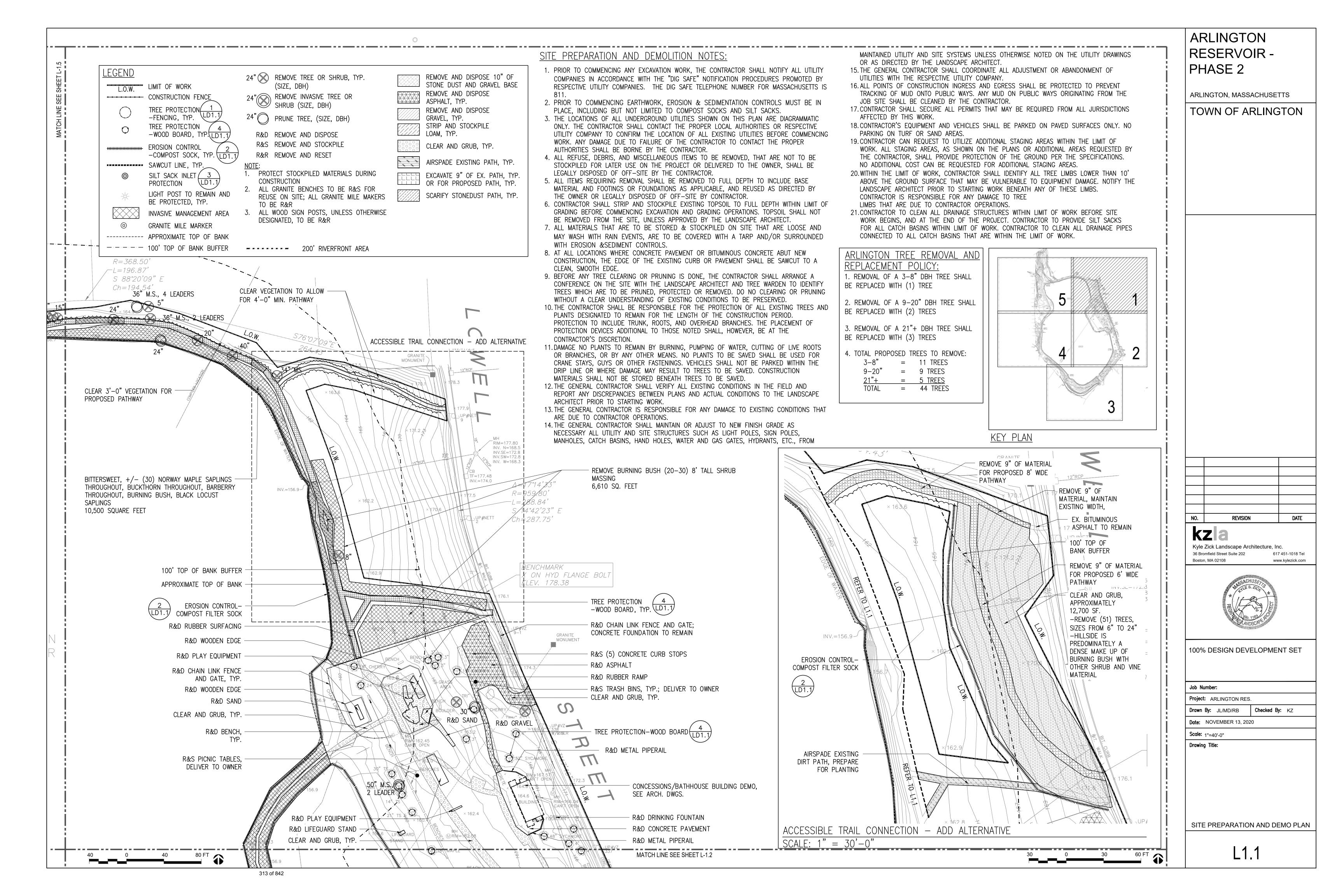


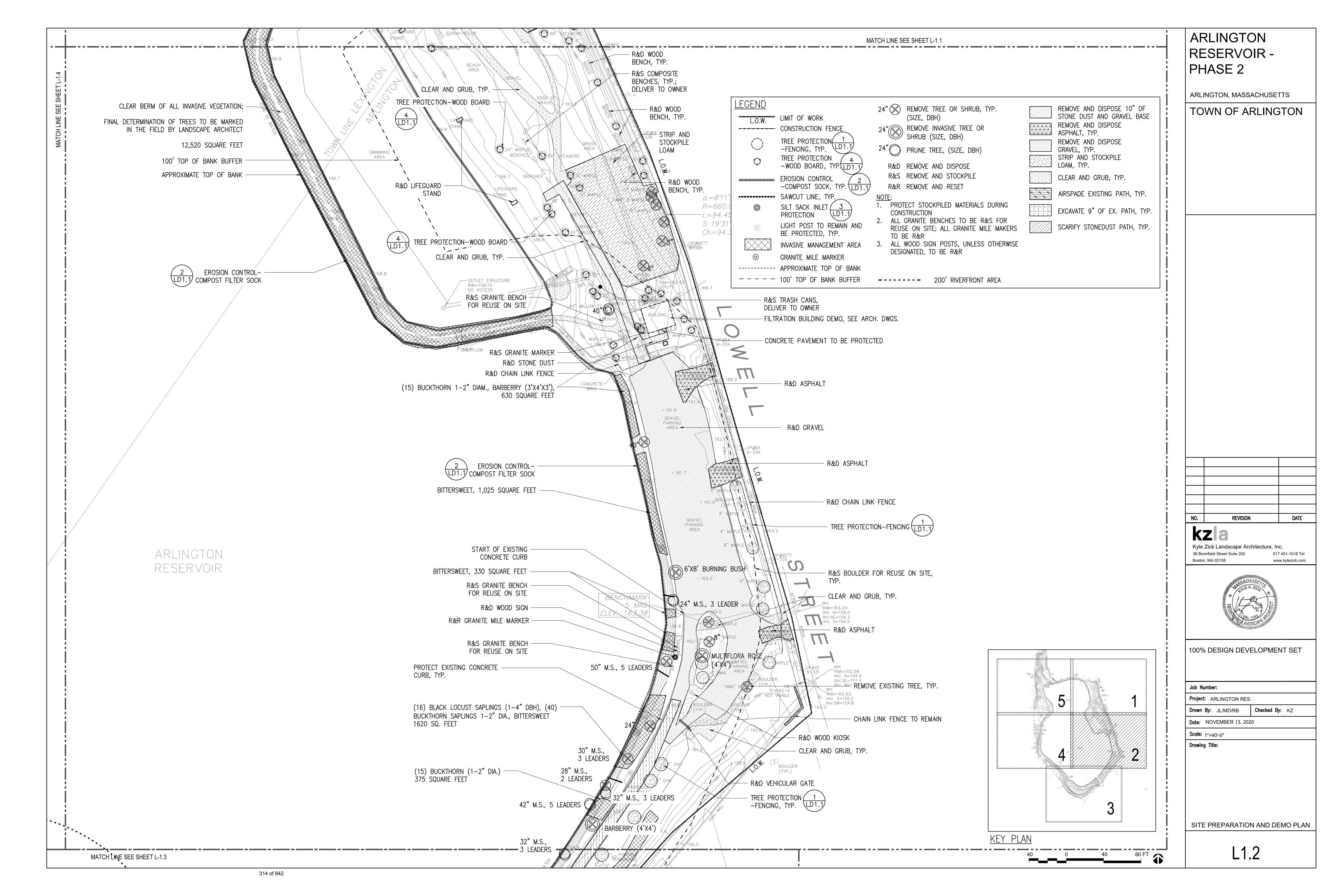
100% DESIGN DEVELOPMENT SET

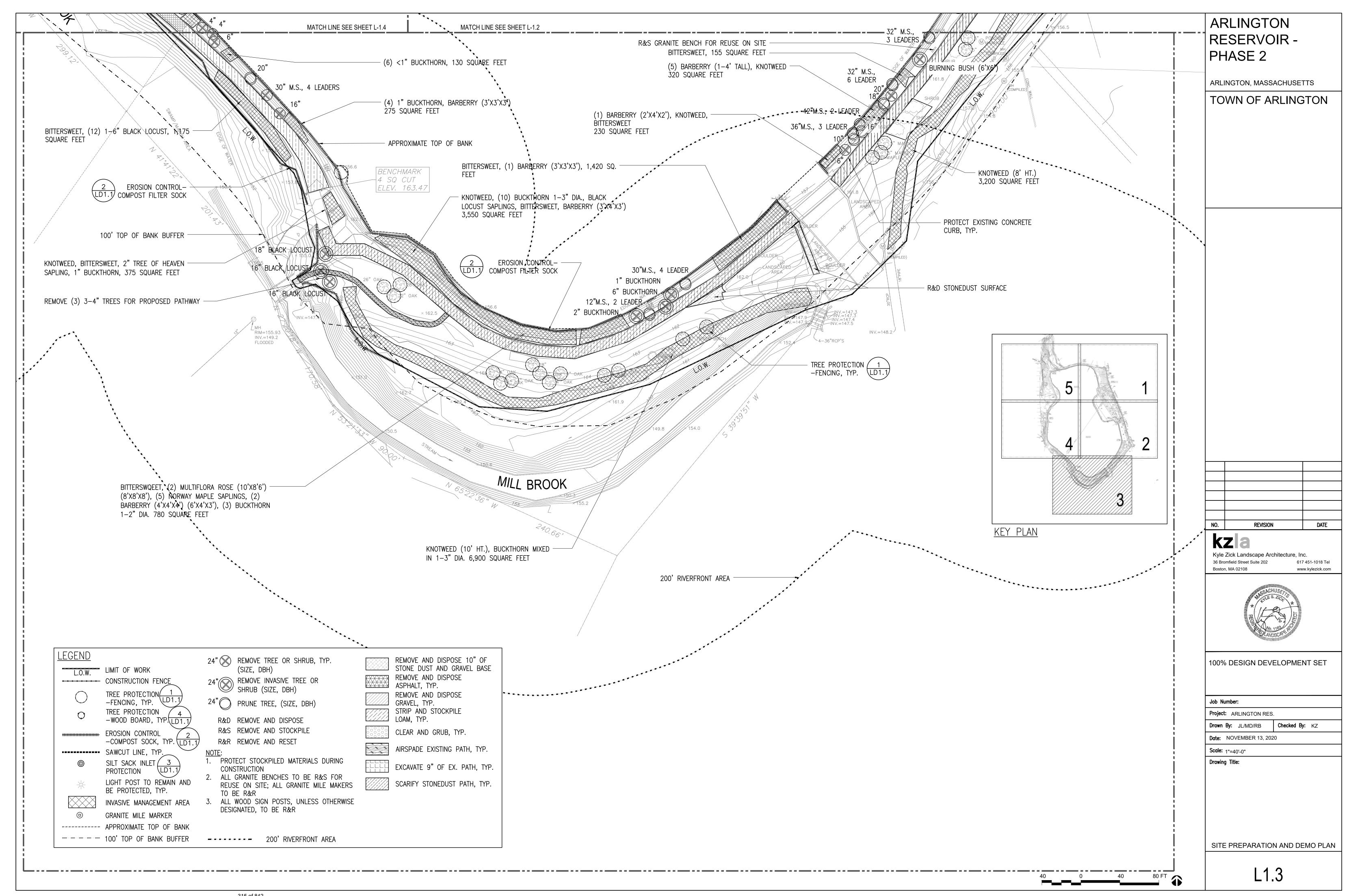
	Job Number: Project: ARLINGTON RES.	
	Drawn By: JL/MD/RB	Checked By: KZ
	Date: NOVEMBER 13, 2020 Scale: AS SHOWN	

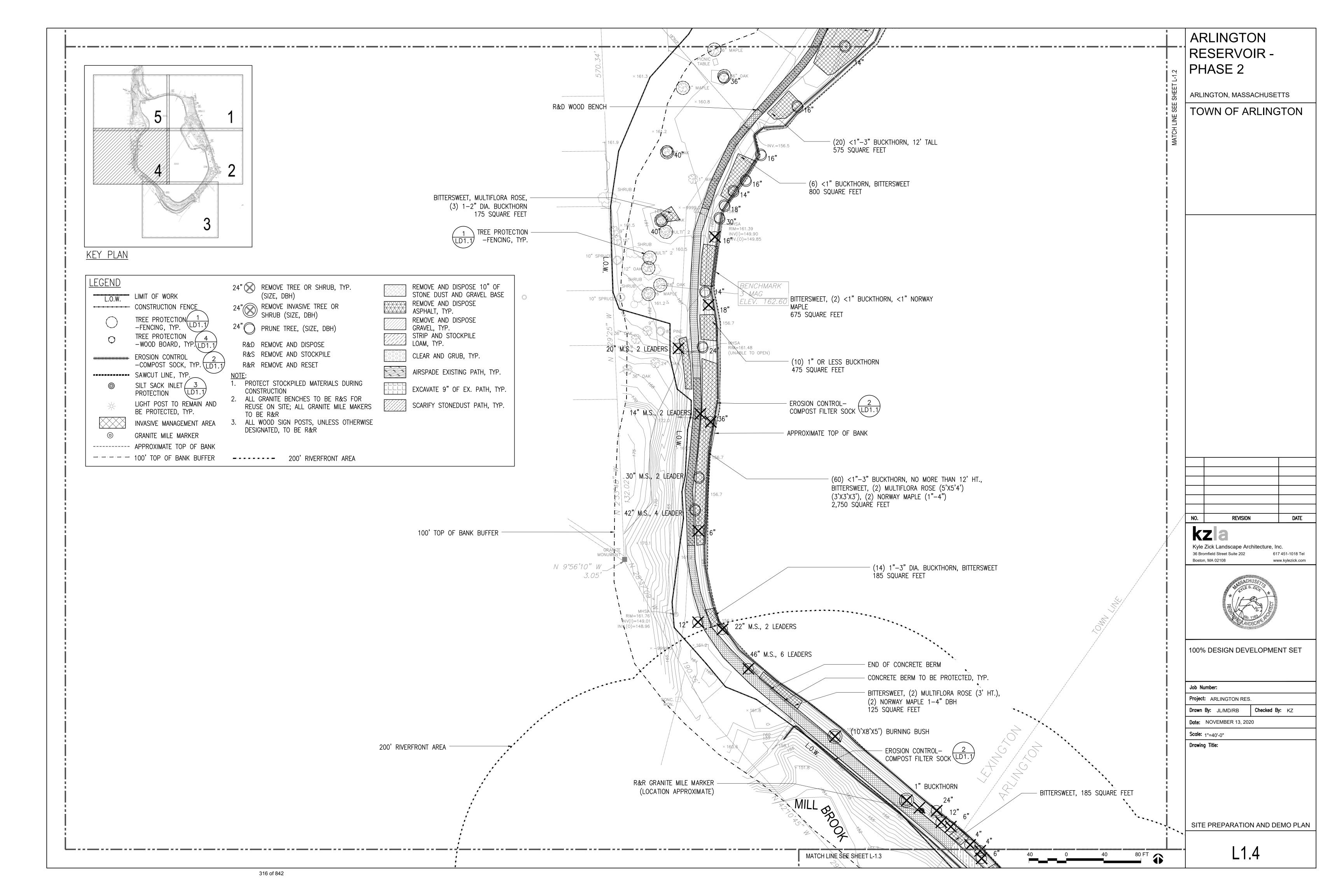
Drawing Title:

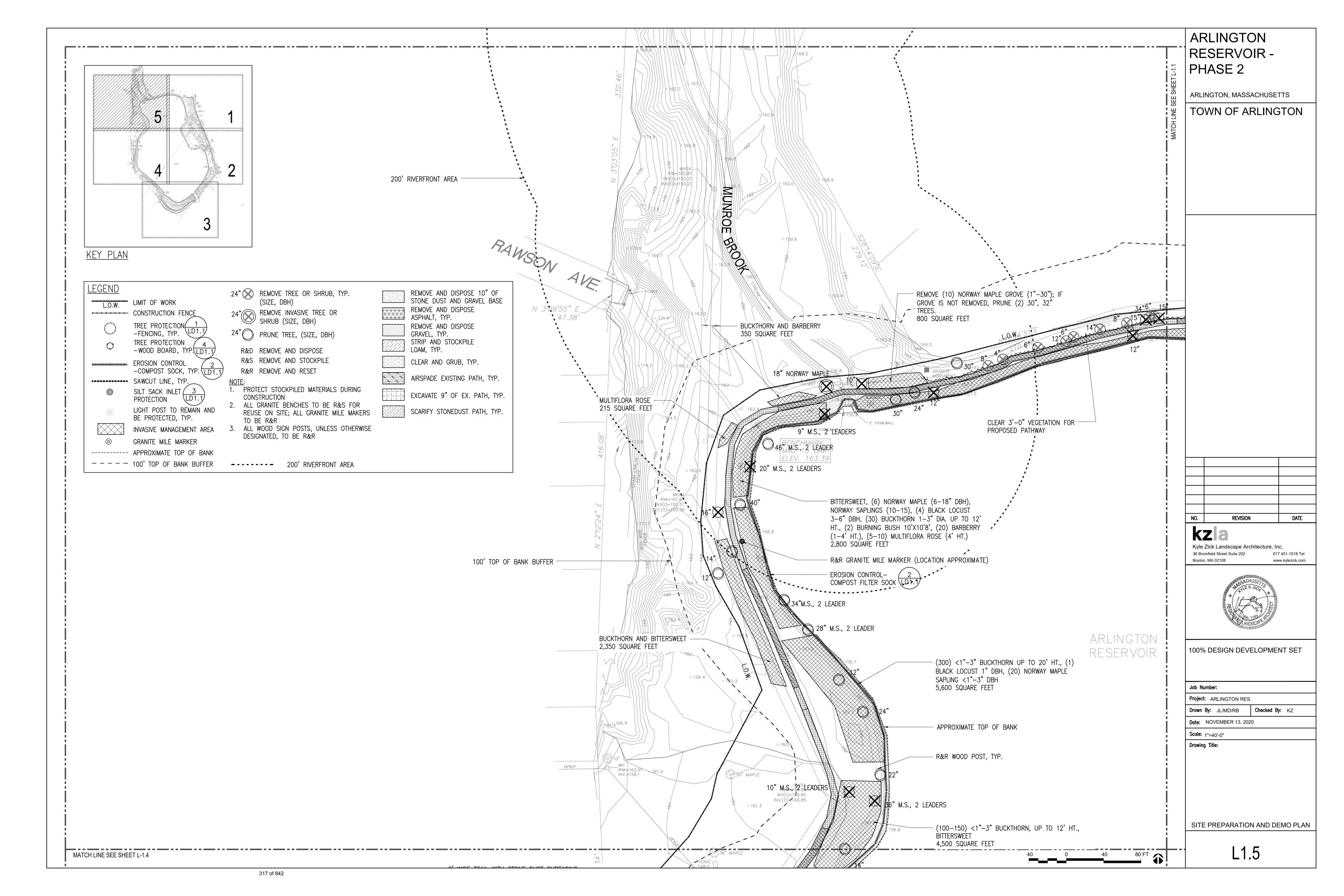
KEY PLAN

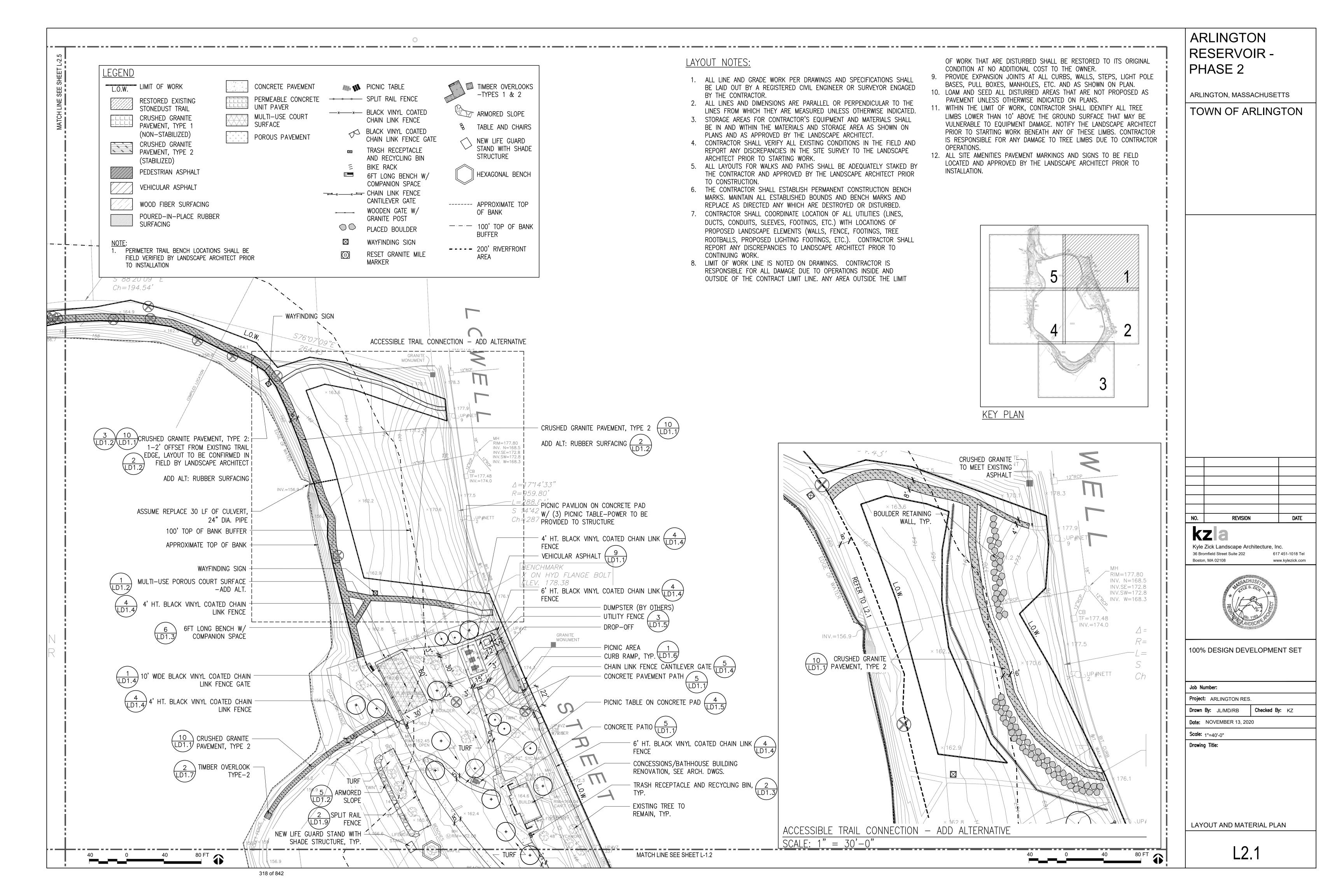


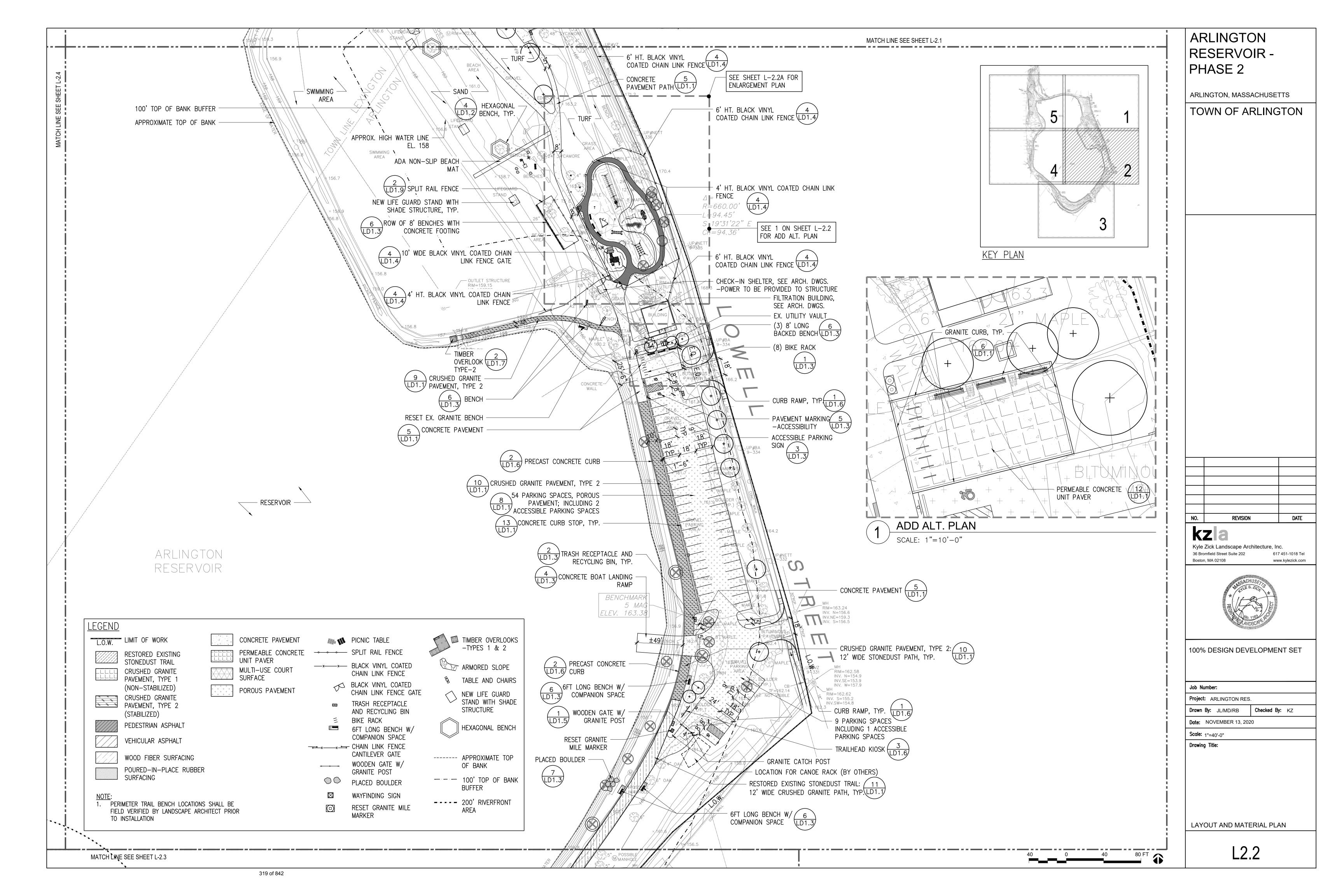


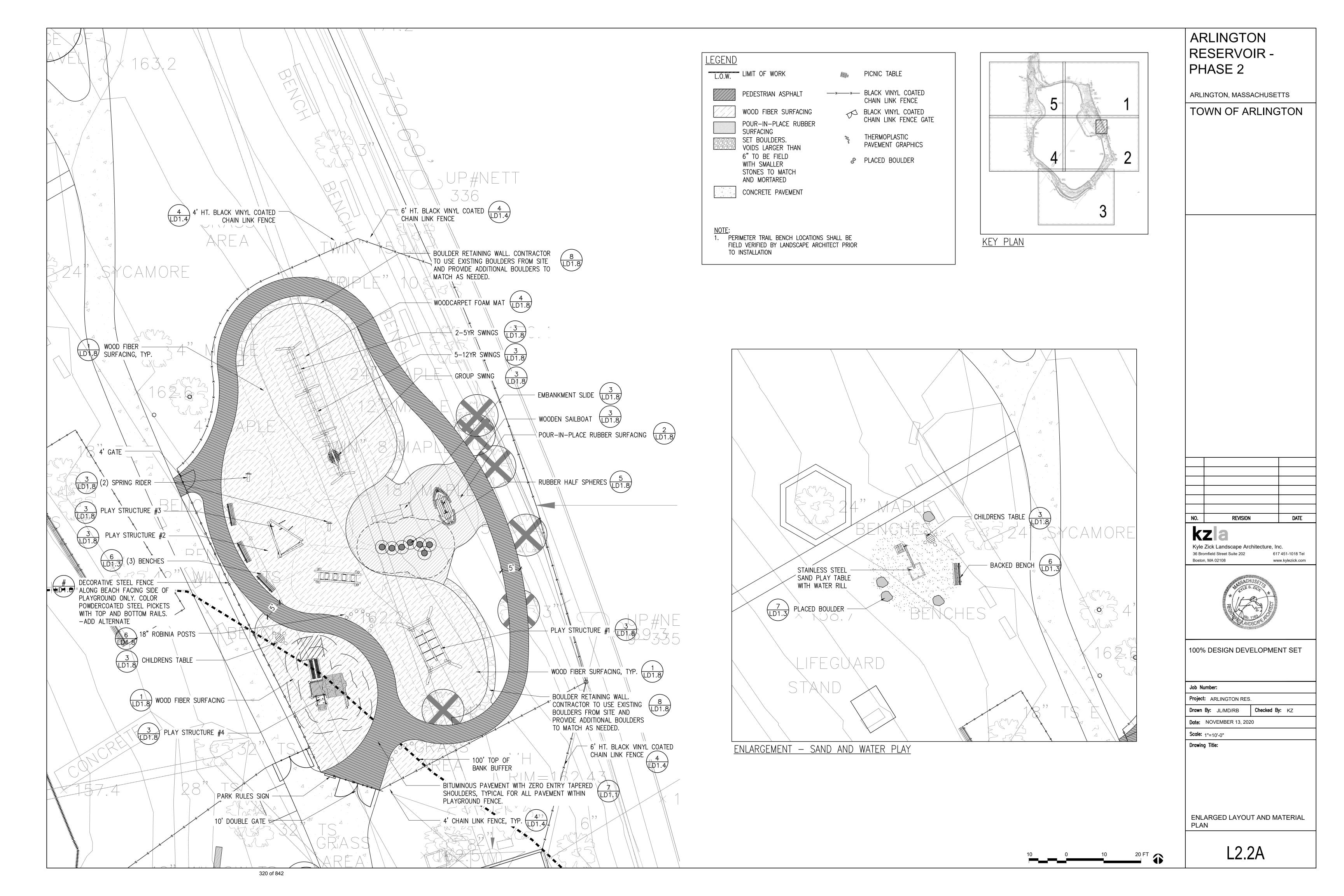


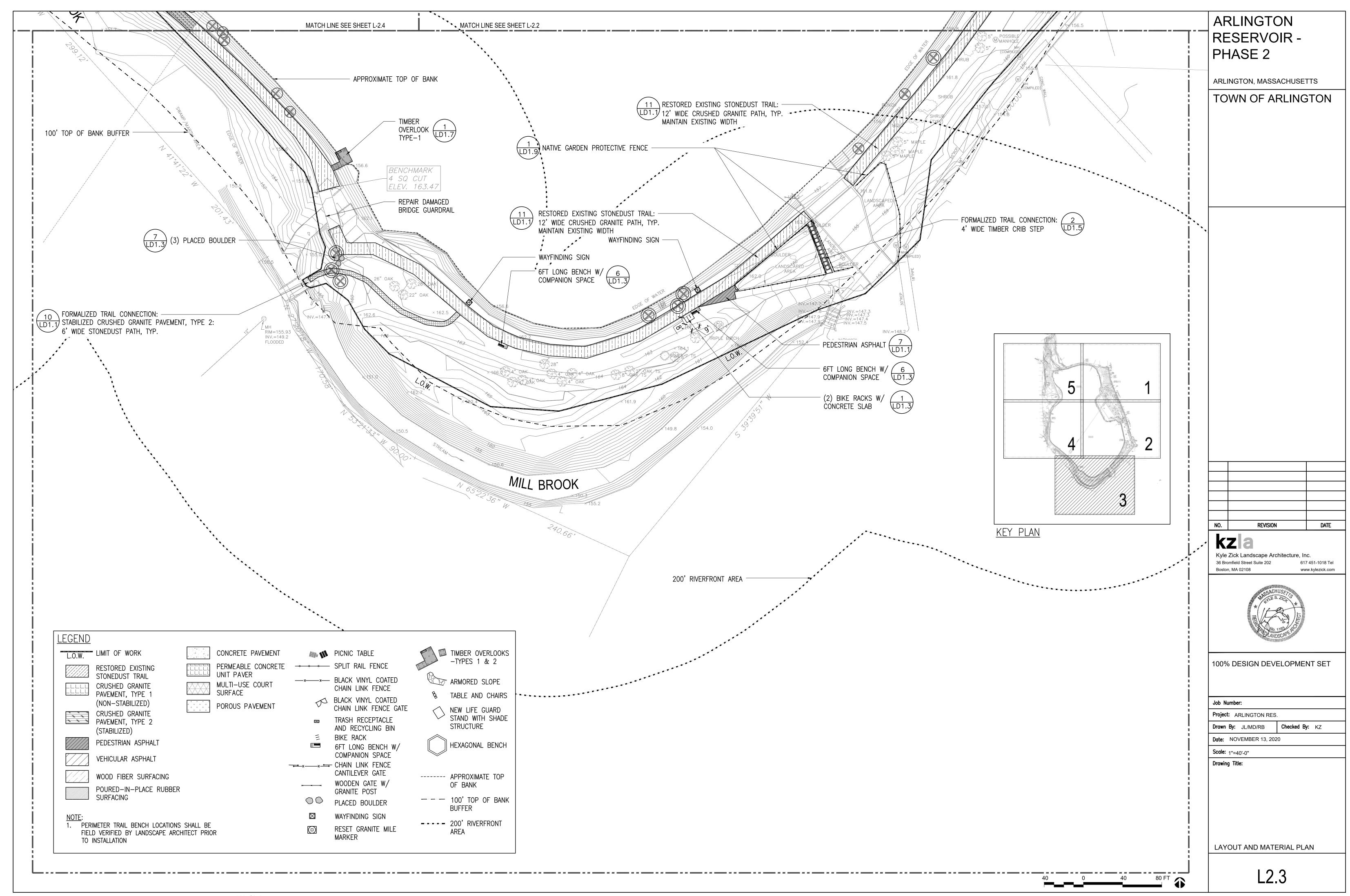


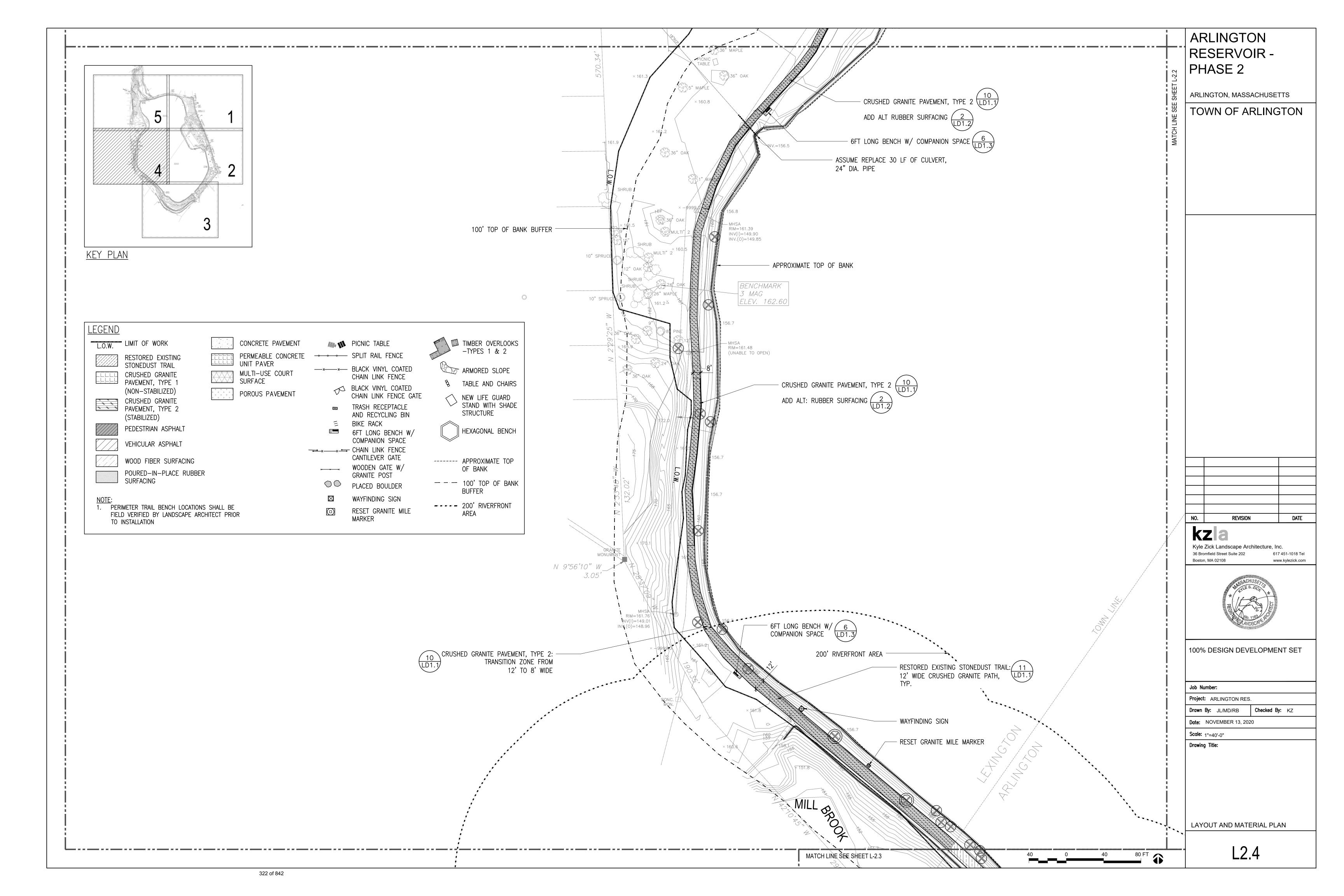


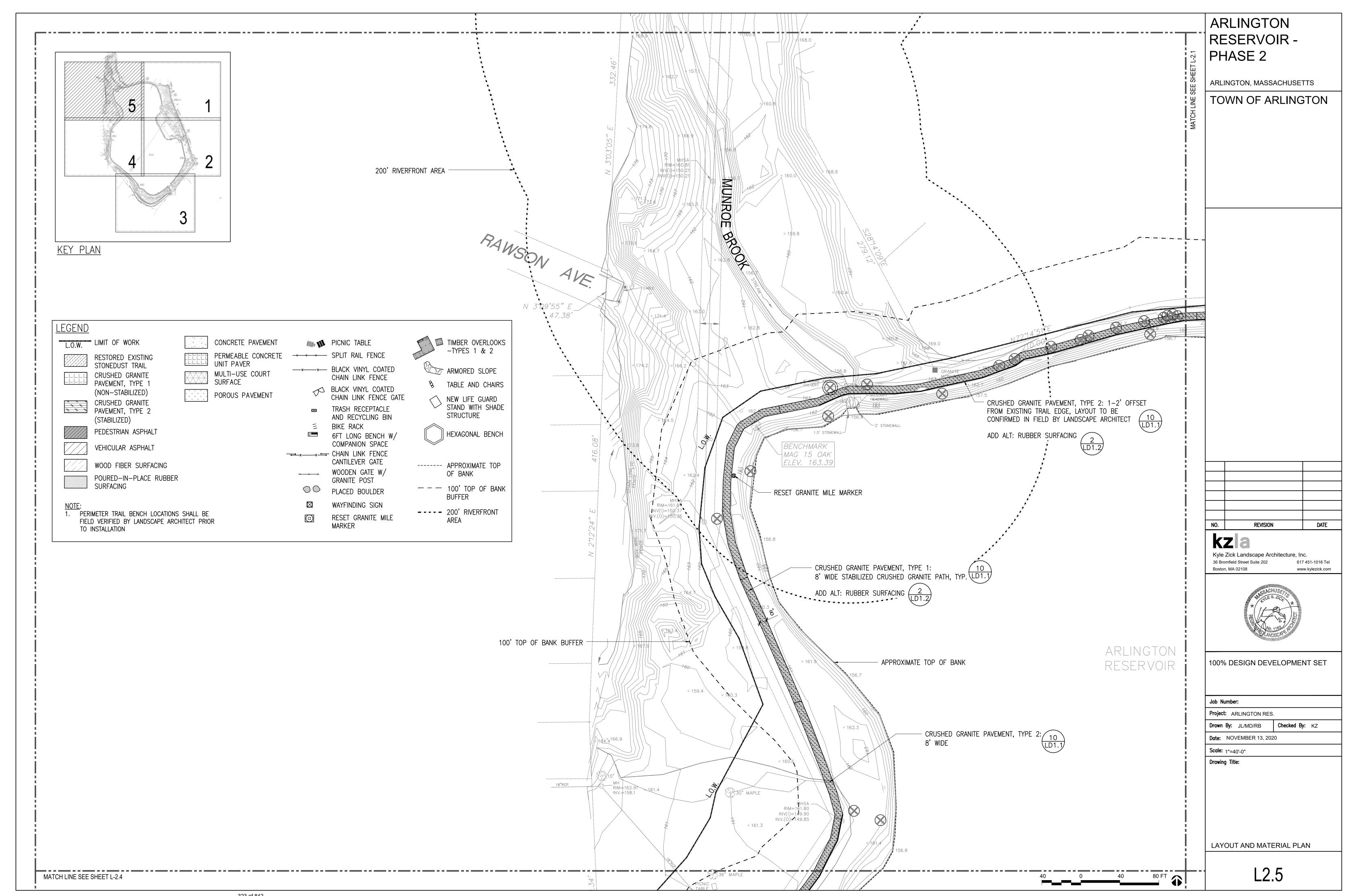


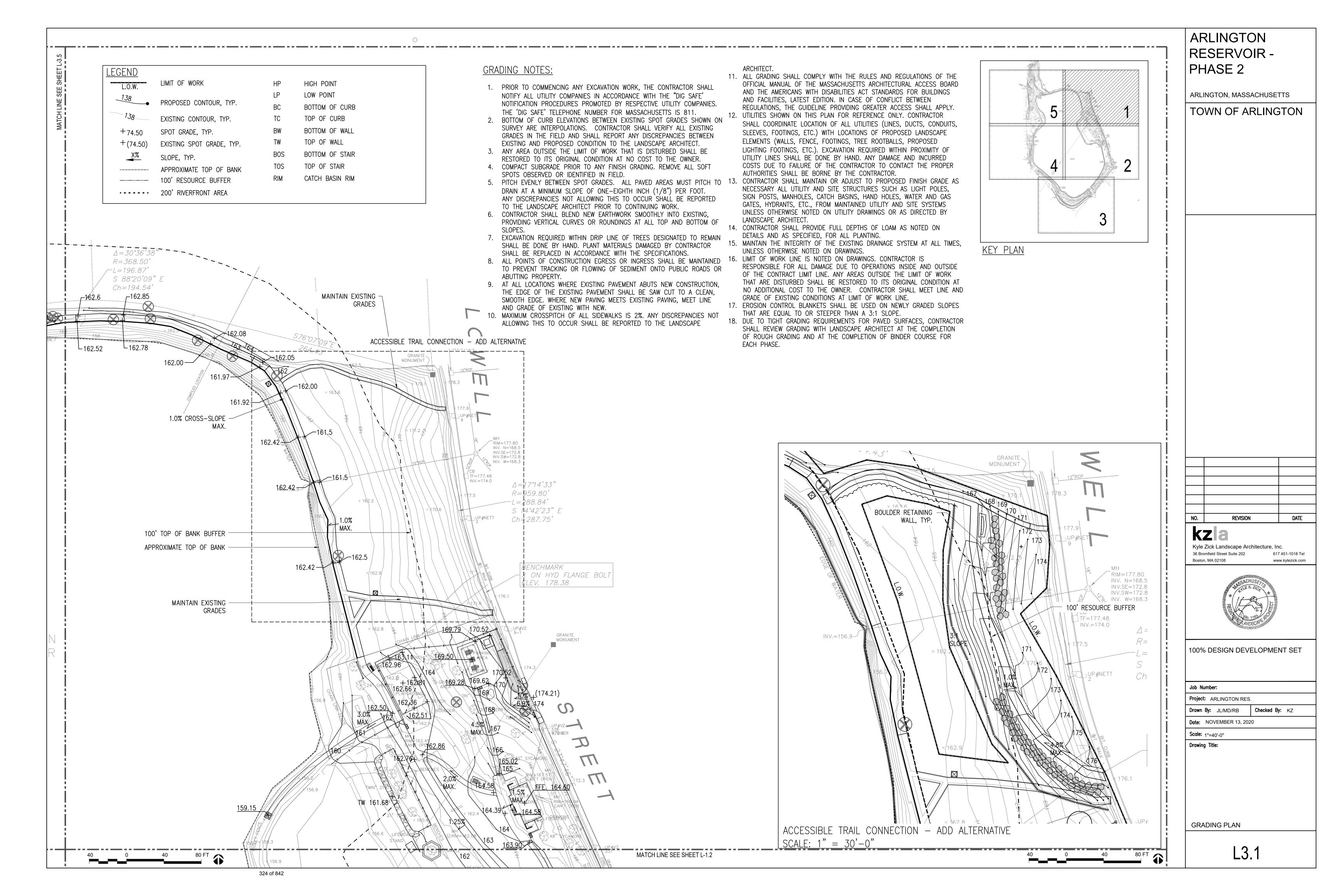


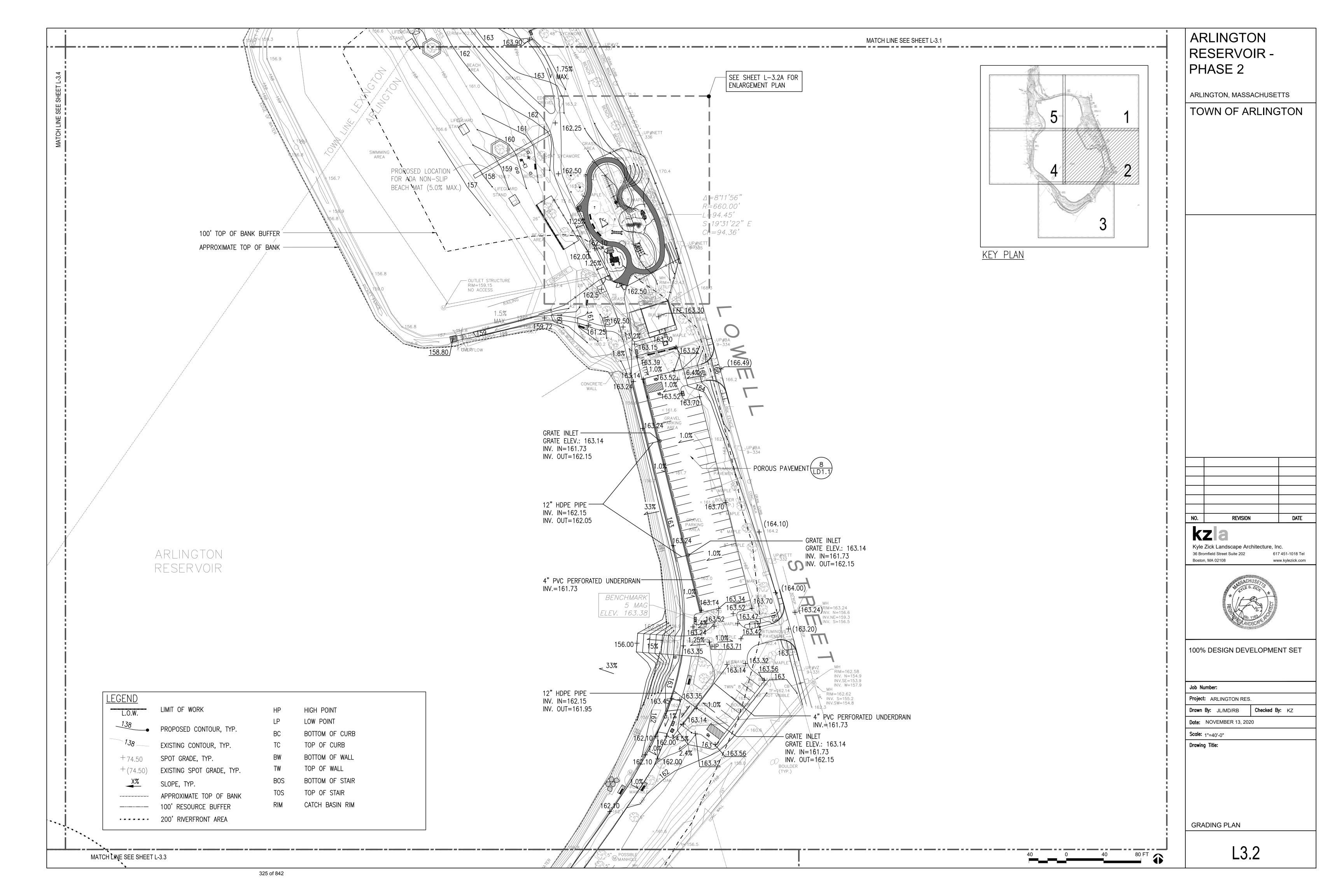


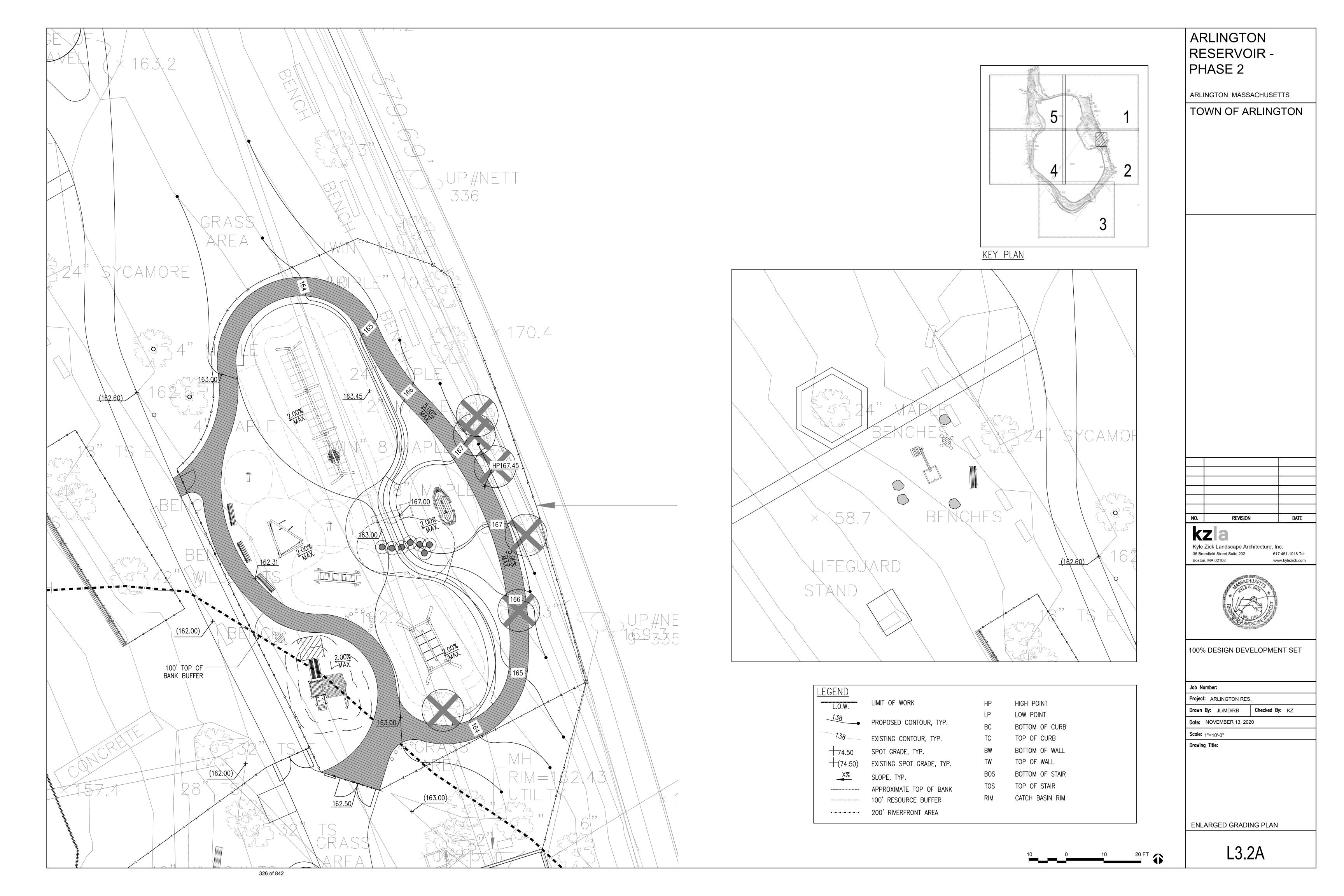


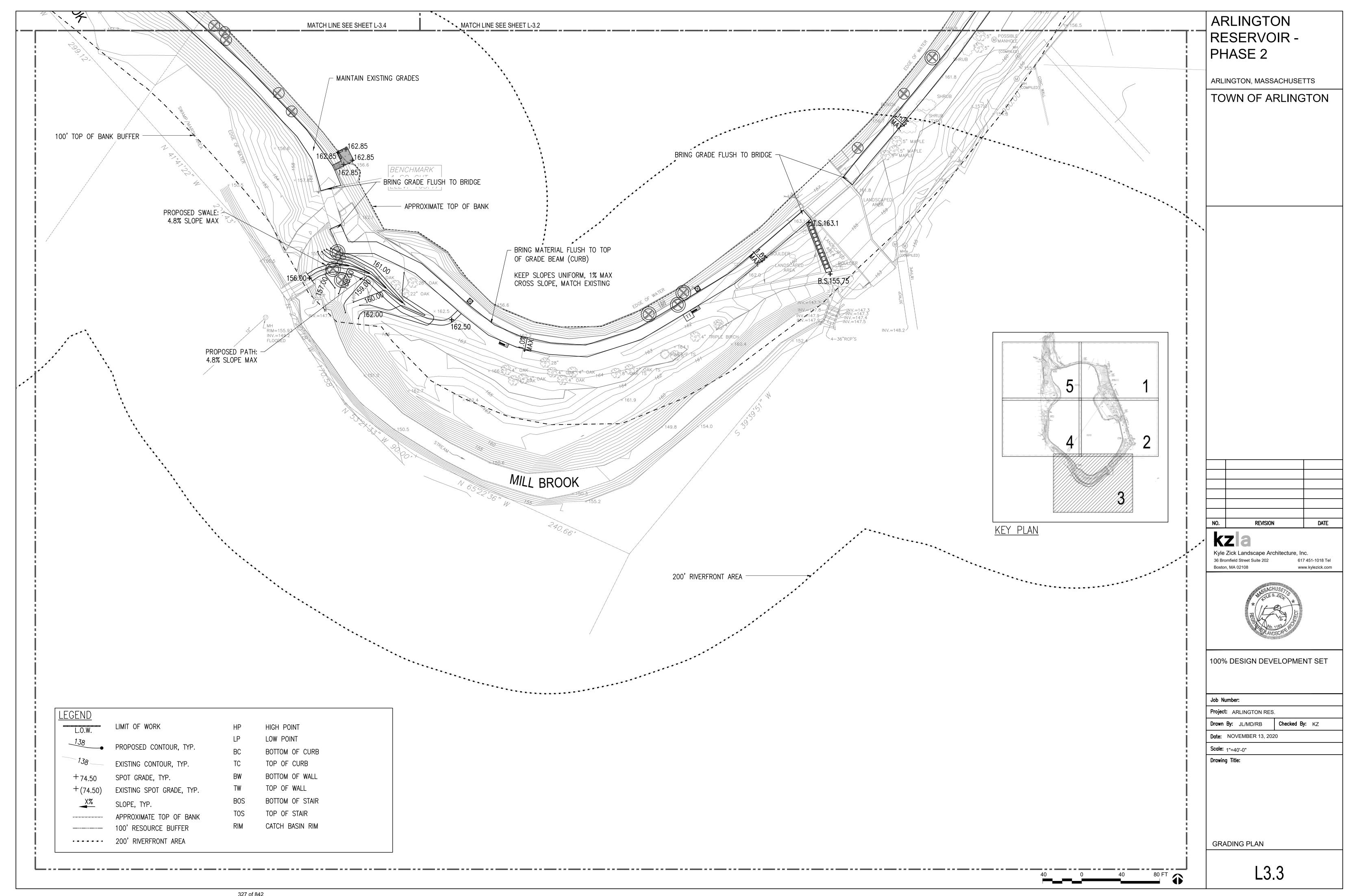


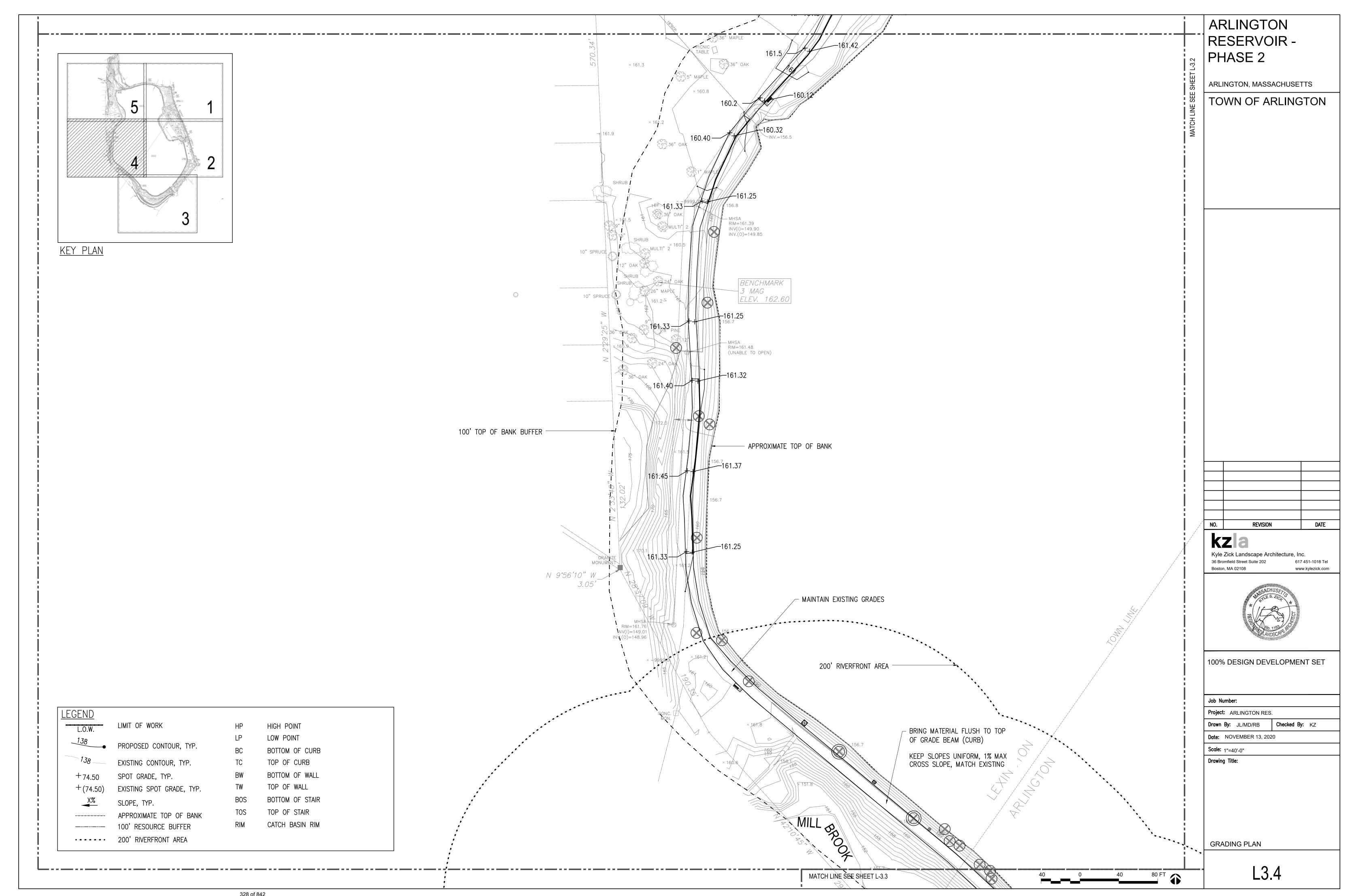


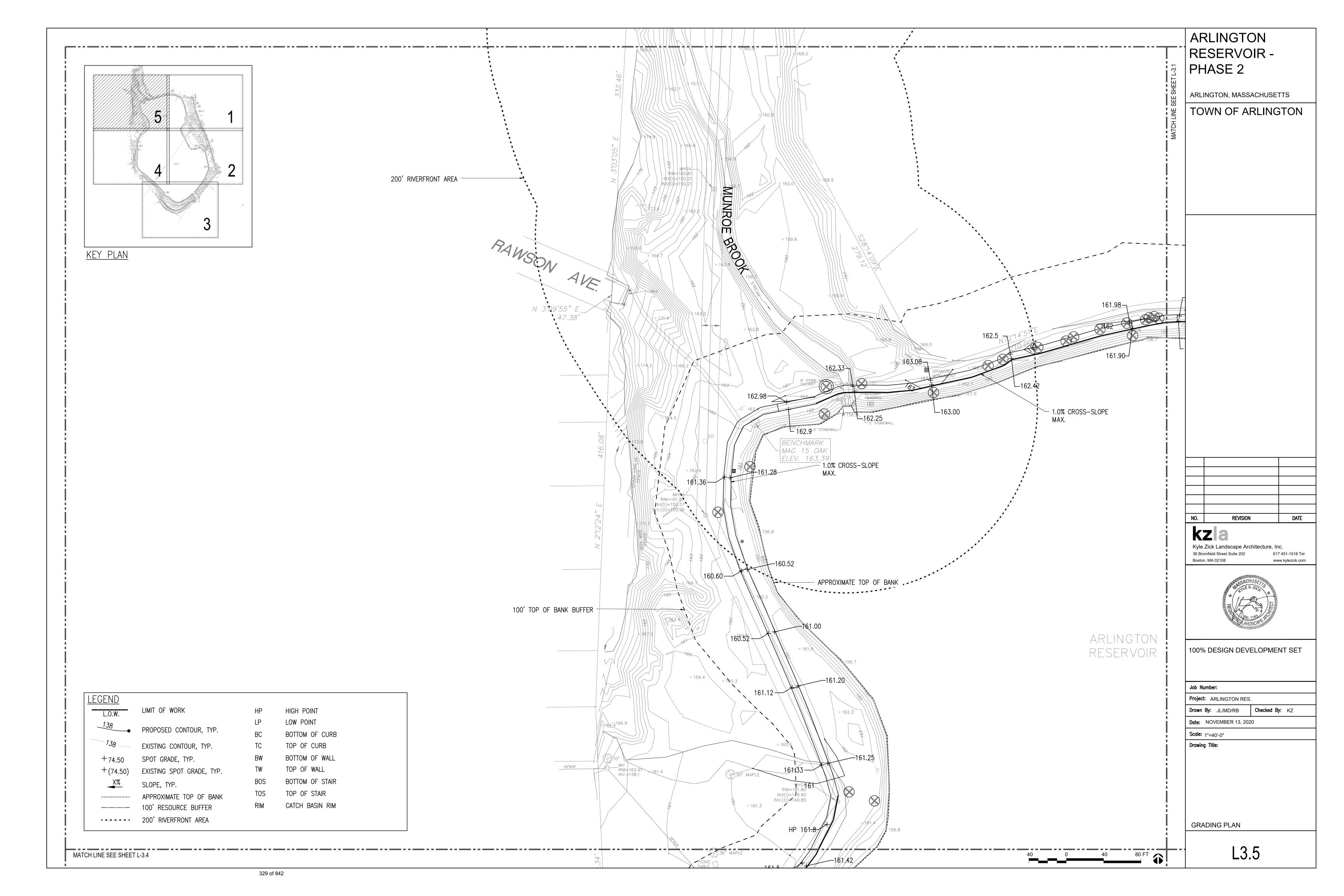


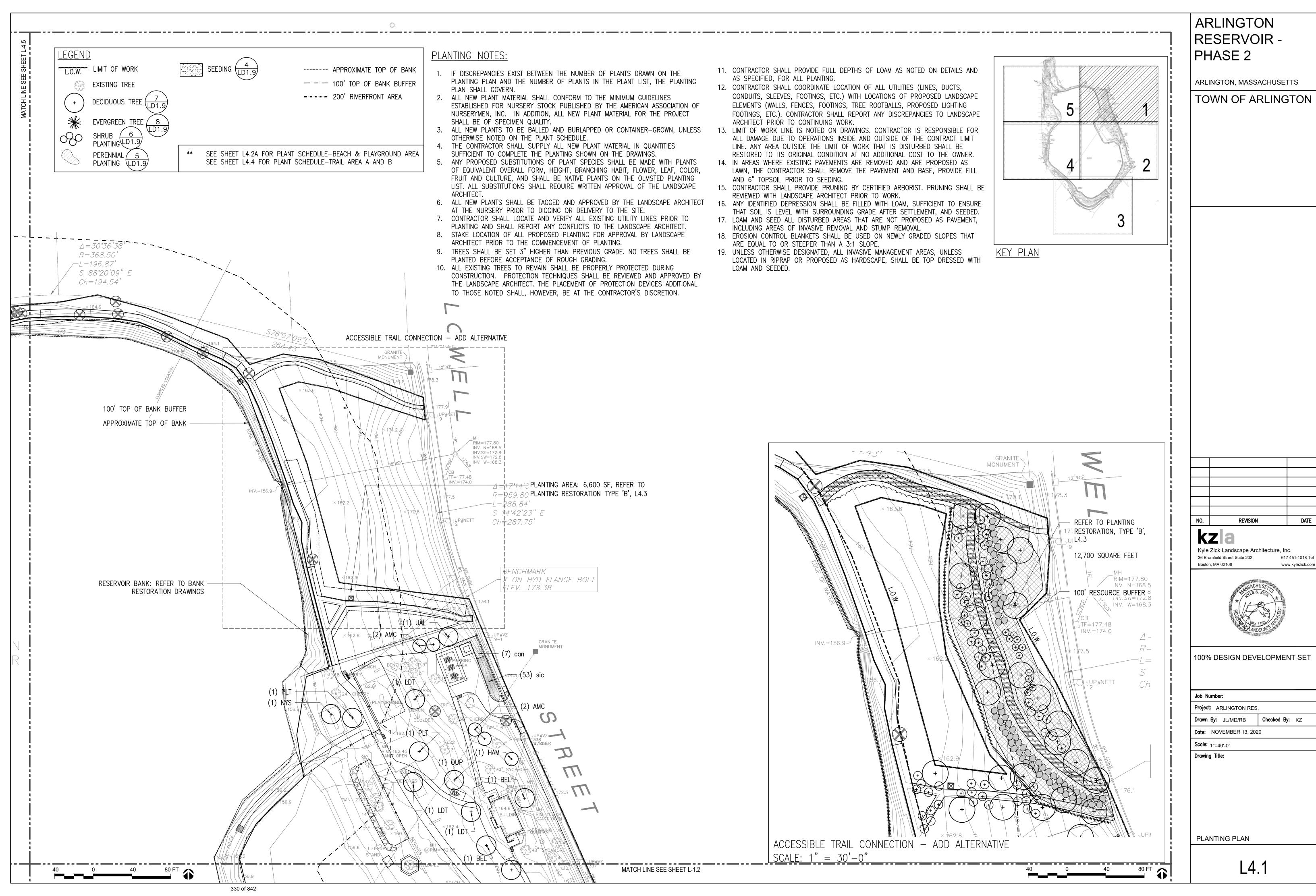




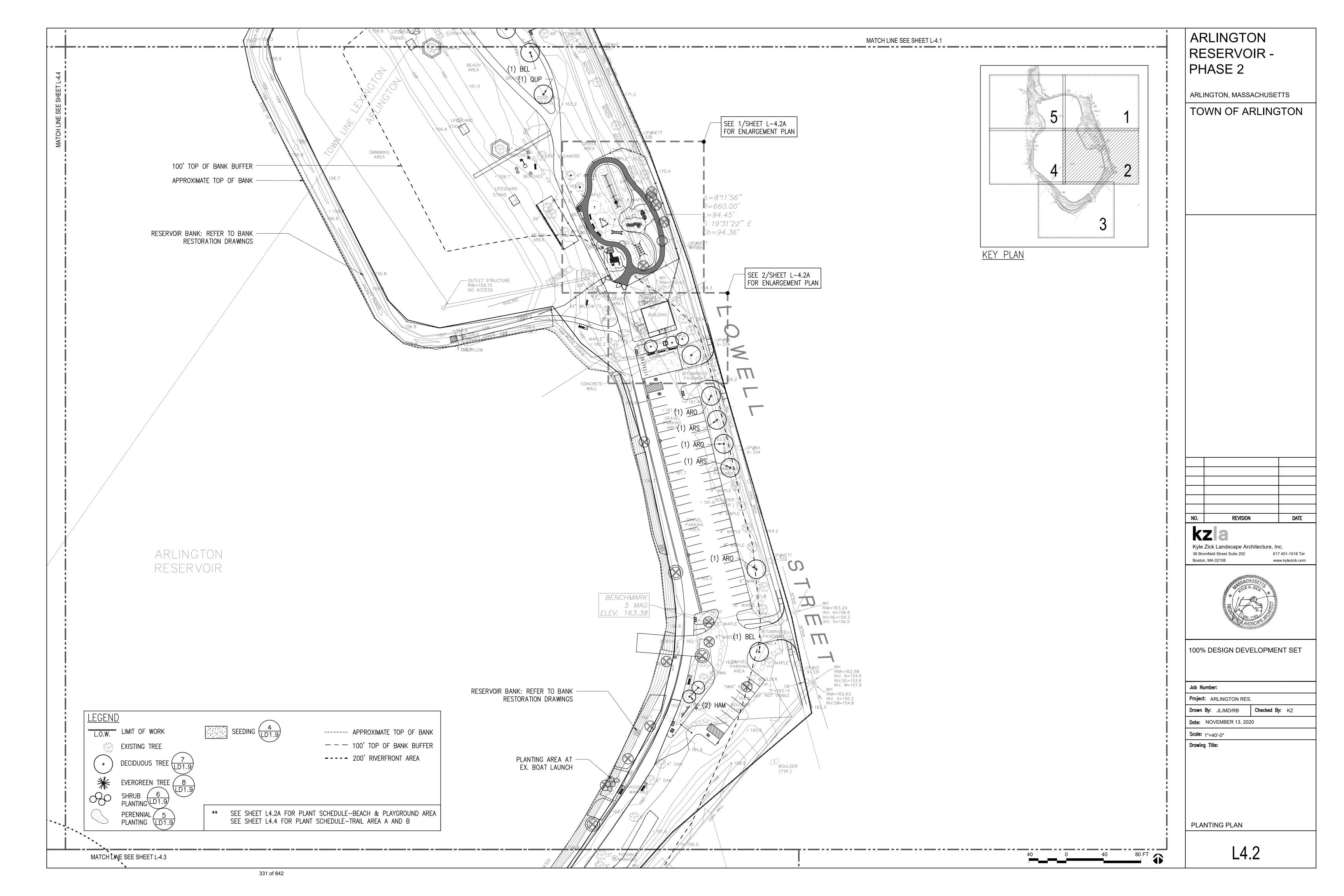


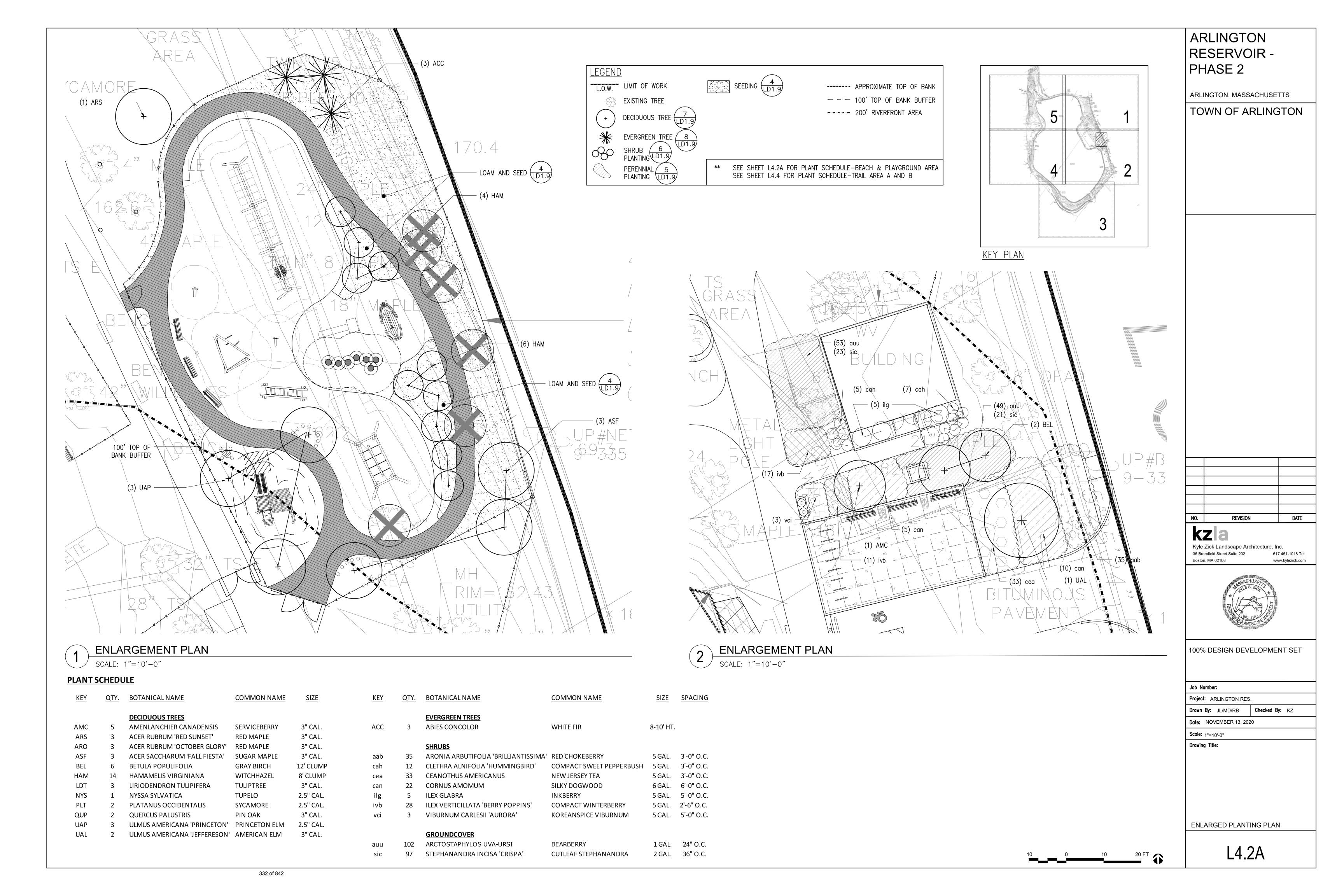


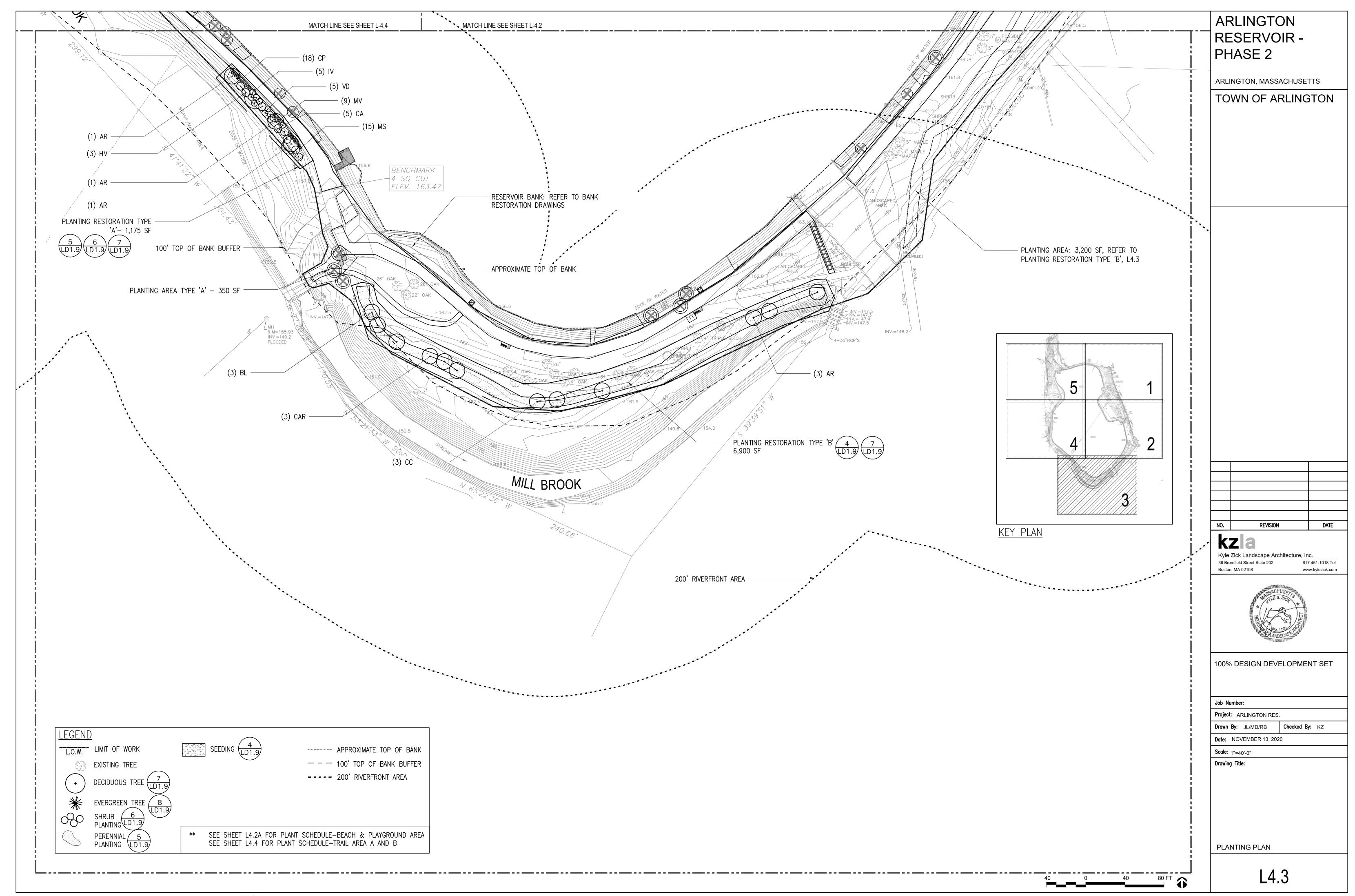


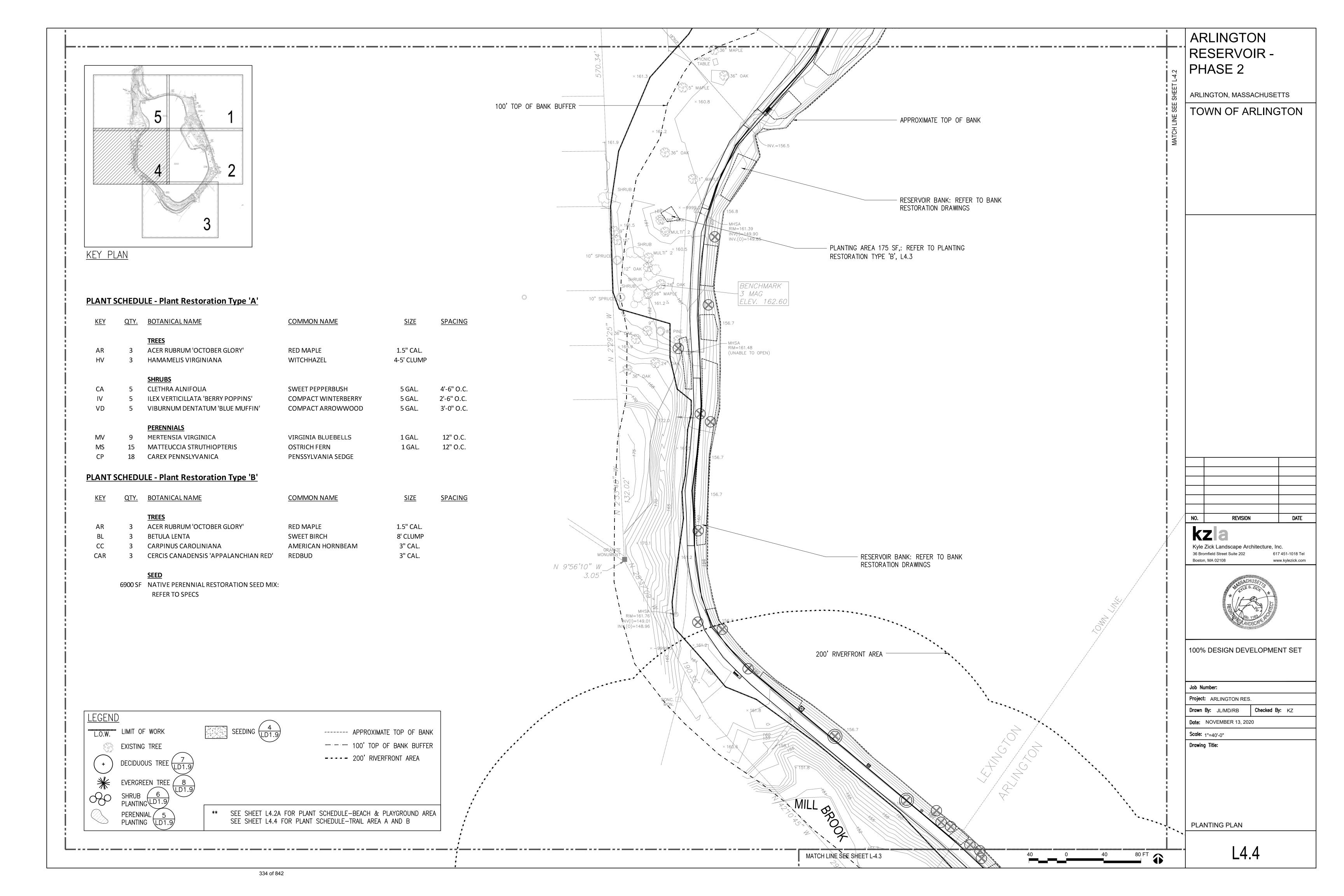


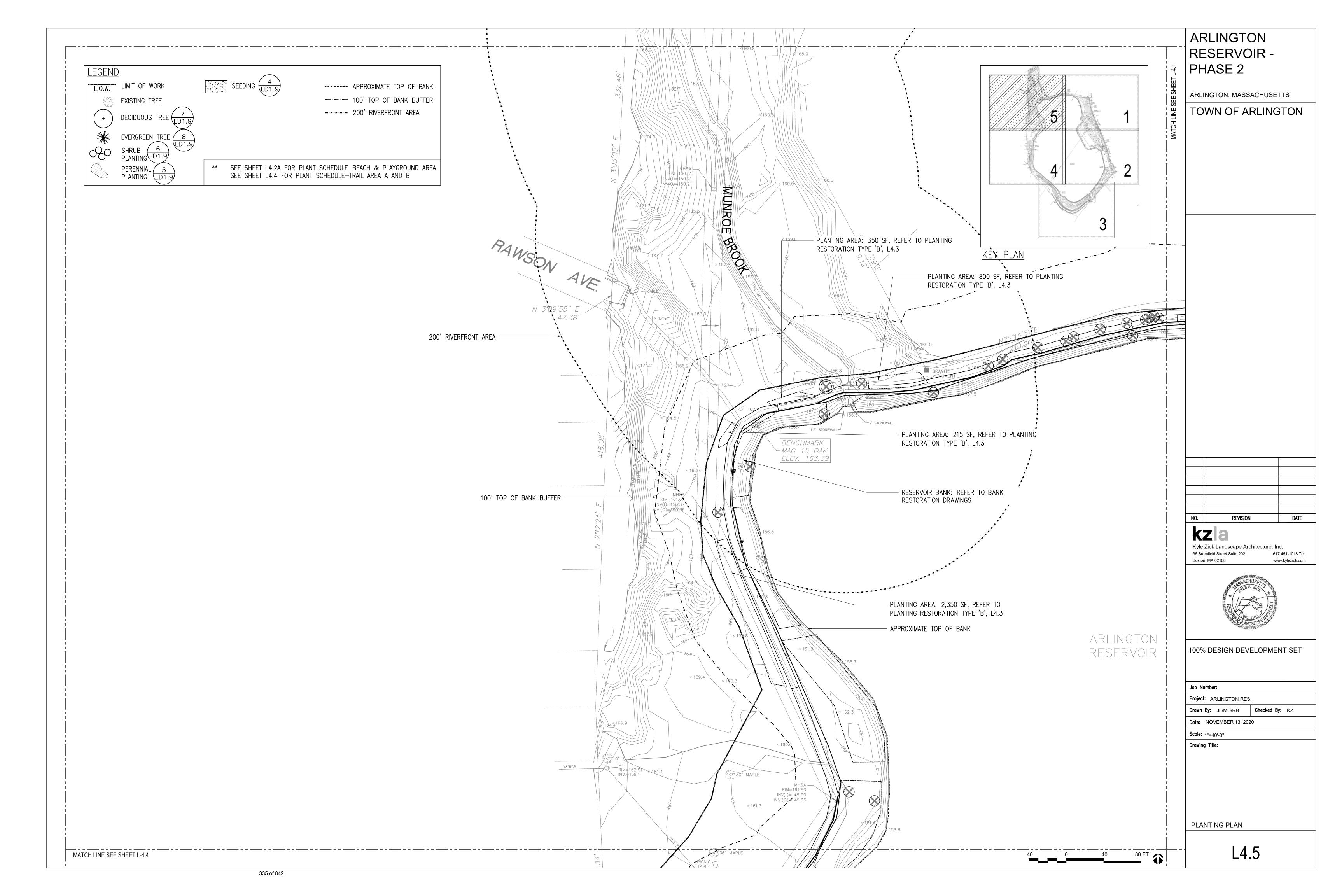
DATE

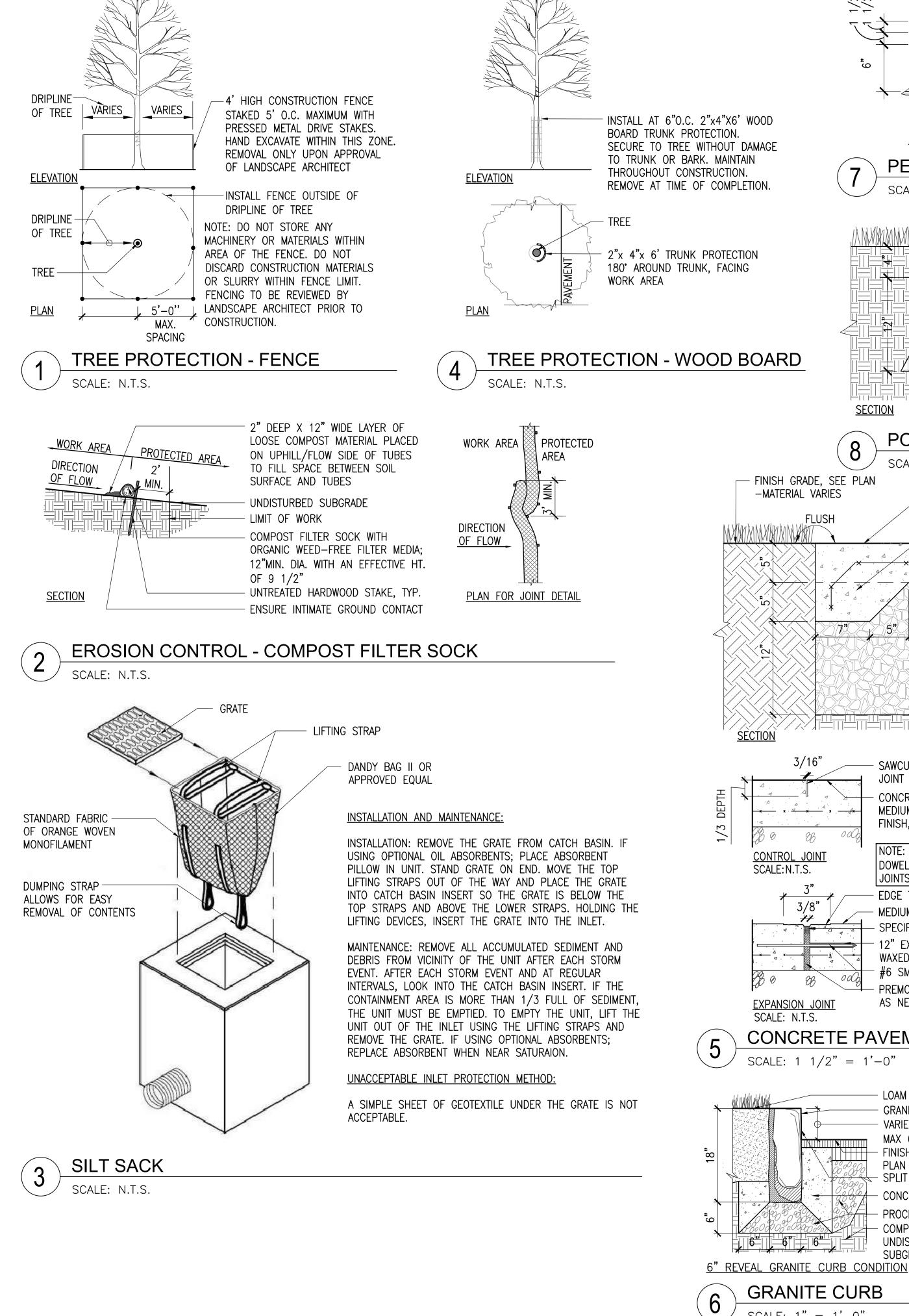


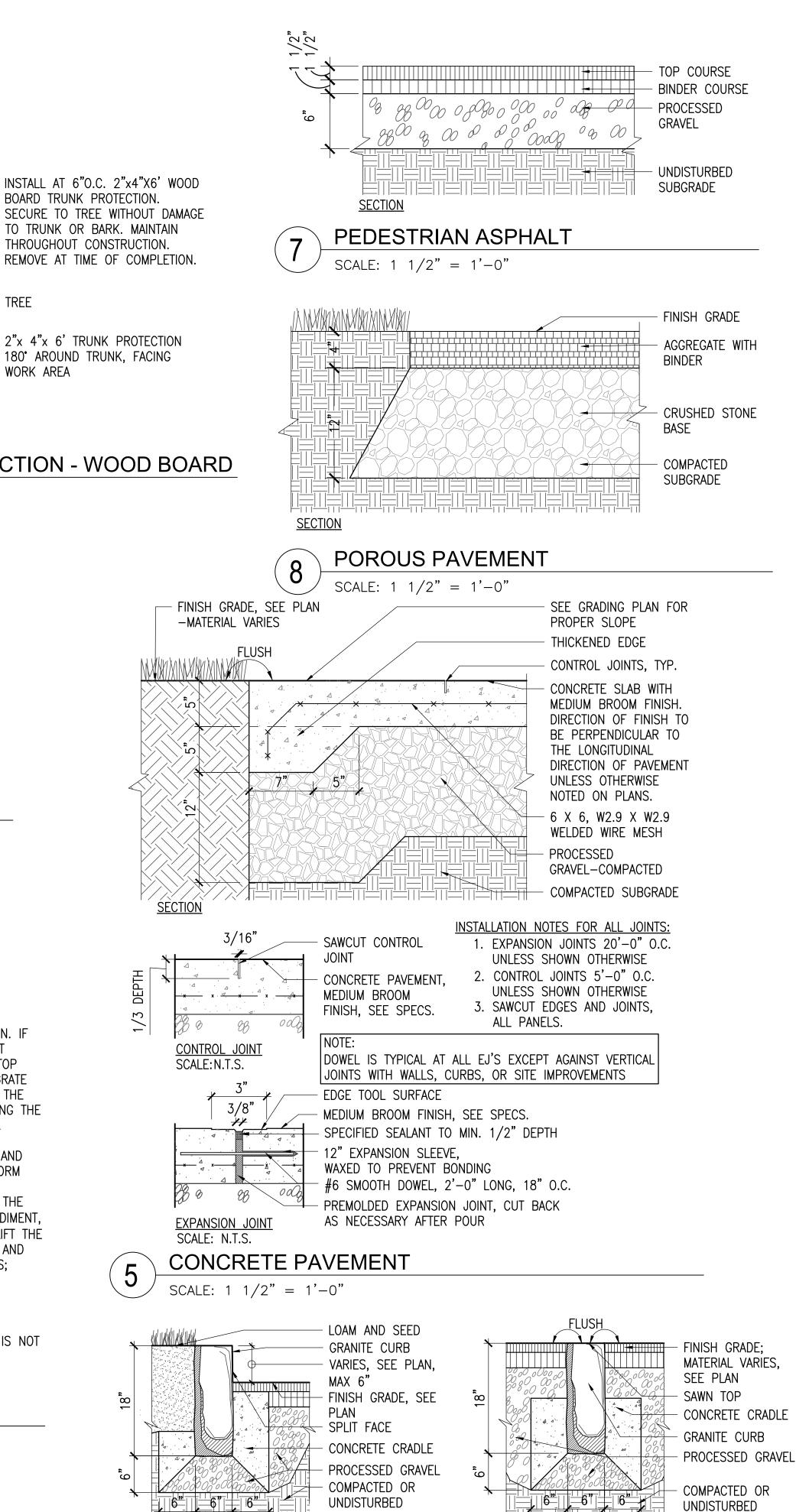












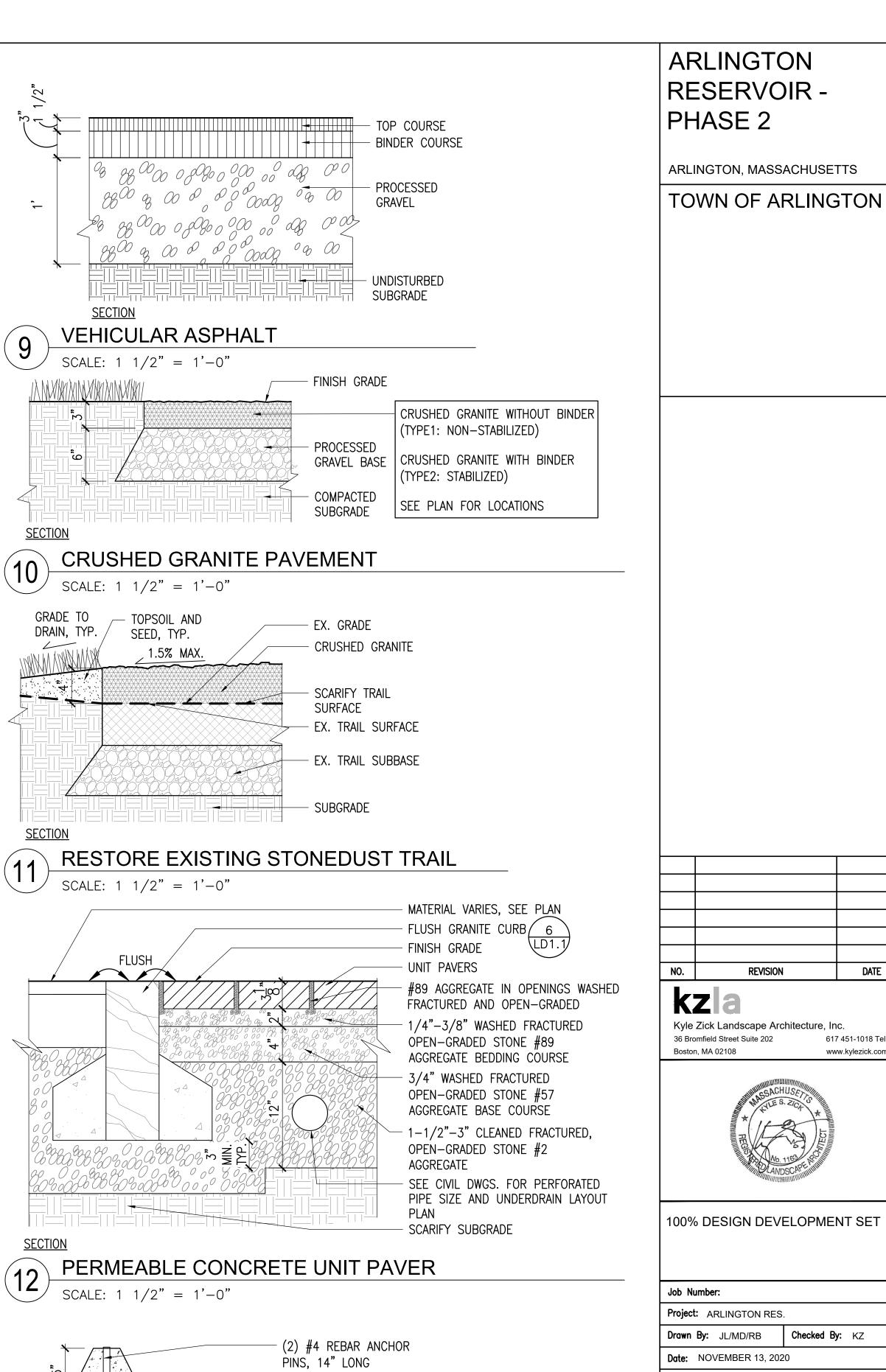
SUBGRADE

GRANITE CURB

SCALE: 1" = 1'-0"

SUBGRADE

FLUSH GRANITE CURB CONDITION



6' PRECAST CONCRETE

POROUS PAVEMENT

CURB STOP

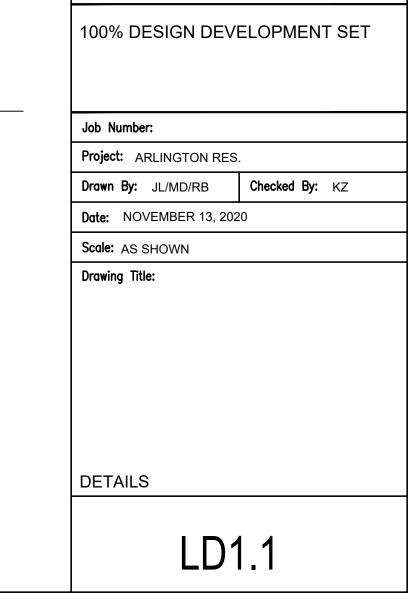
FINISH GRADE

1. CURB STOPS TO BE 6' LONG

CONCRETE CURB STOP

SCALE: 1 1/2" = 1'-0"

2. SET ON CENTER TO PARKING SPACE

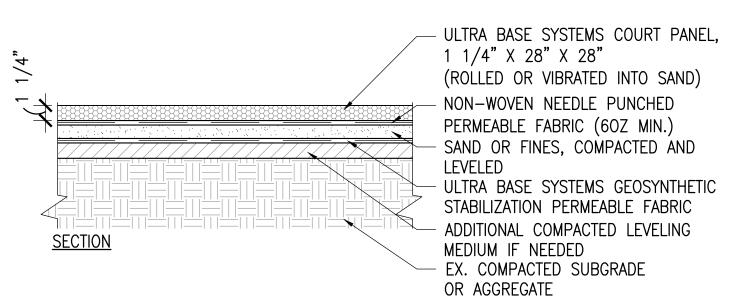


REVISION

DATE

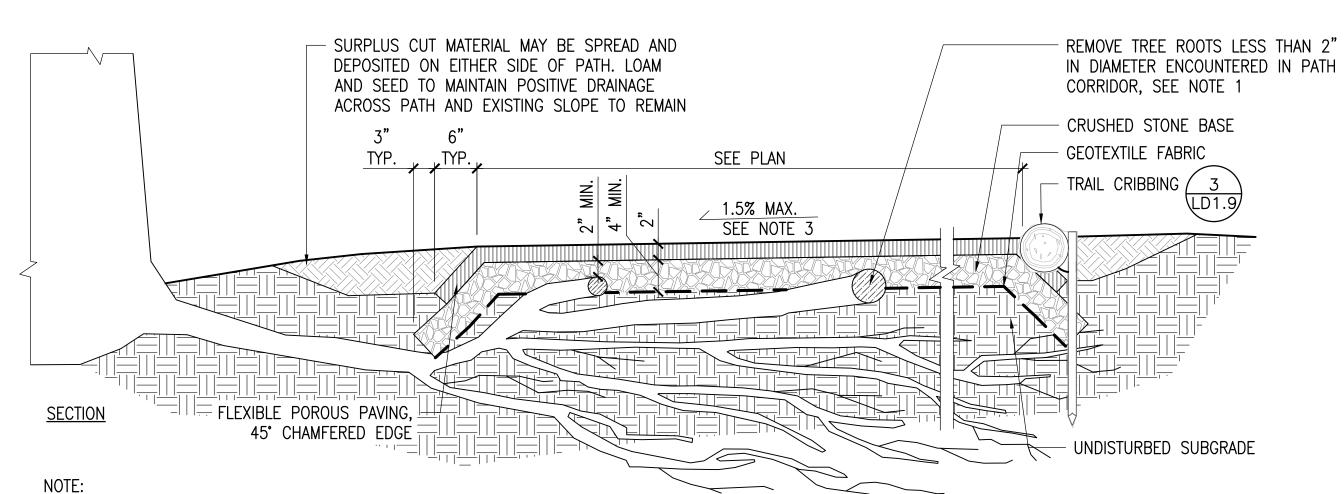
617 451-1018 Tel

www.kylezick.com



PERMEABLE ATHLETIC COURT SURFACING

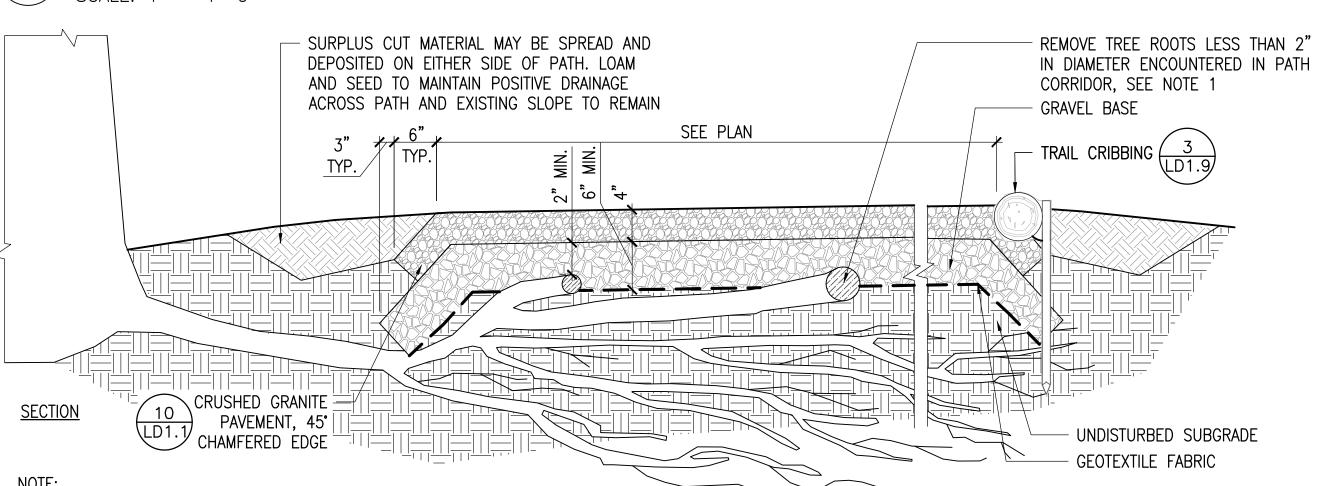
SCALE: 1 1/2" = 1'-0"



- 1. TO PREVENT INJURY TO CRITICAL ROOT ZONES OF ADJACENT TREES, SOIL IS TO BE EXCAVATED NON—INVASIVELY A MINIMUM OF 6 INCHES USING SUPERSONIC AIR KNIFE. FABRIC AND STONE ARE TO BE INSTALLED OVER AND AROUND ROOTS. SUBGRADE SHALL BE COMPACTED TO THE GREATEST EXTENT POSSIBLE. ROOT PRUNING MAY BE PERFORMED BY ARBORIST AS NEEDED ON SELECTED ROOTS LESS THAN 2 INCHES IN DIAMETER PROVIDED NO MORE THAN 15% OF THE CRITICAL ROOT ZONE IS REMOVED.
- 2. WHEREVER POSSIBLE, AND WITHOUT INJURING CRITICAL ROOT ZONES OF ADJACENT TREES. CRUSHED STONE BASE SHALL RUN 6 INCHES BEYOND THE END OF THE FLEXIBLE POROUS PAVING. AT LEAST 2" OF STONE SHALL COVER THE TOP OF ROOTS BEFORE FLEXIBLE POROUS MATERIAL IS LAID.

 3. WALKWAY SHALL MAINTAIN A CROSS PITCH OF NOT MORE THAN ONE AND A HALF (1.5%) PERCENT ANY DISCREPANCY NOT ALLOWING THIS TO OCCUR SHALL BE
- 3. WALKWAY SHALL MAINTAIN A CROSS PITCH OF NOT MORE THAN ONE AND A HALF (1.5%) PERCENT. ANY DISCREPANCY NOT ALLOWING THIS TO OCCUR SHALL BE REPORTED TO LANDSCAPE ARCHITECT PRIOR TO CONTINUING WORK.

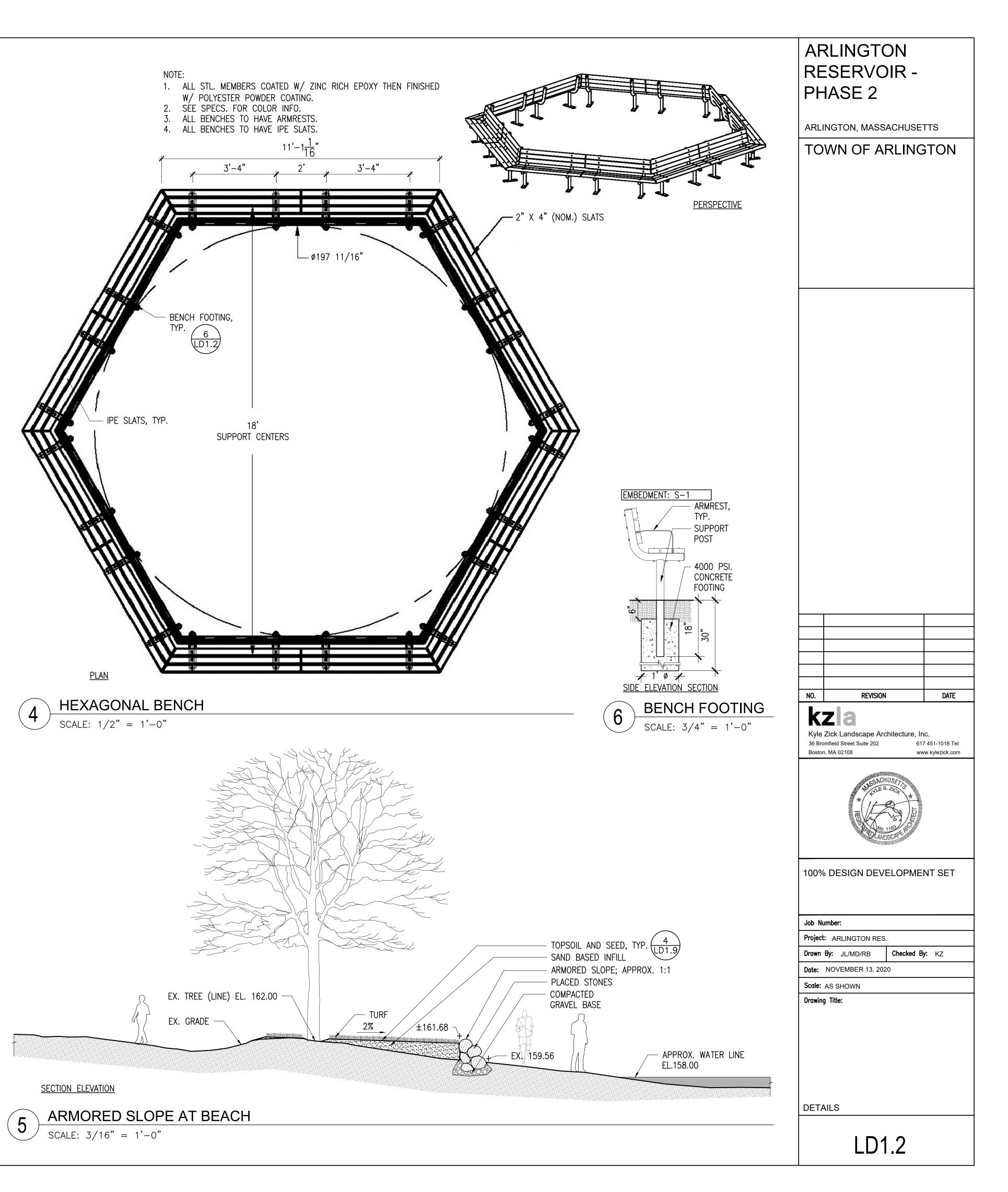
RUBBER SURFACING - TRAIL (ADD ALTERNATE)

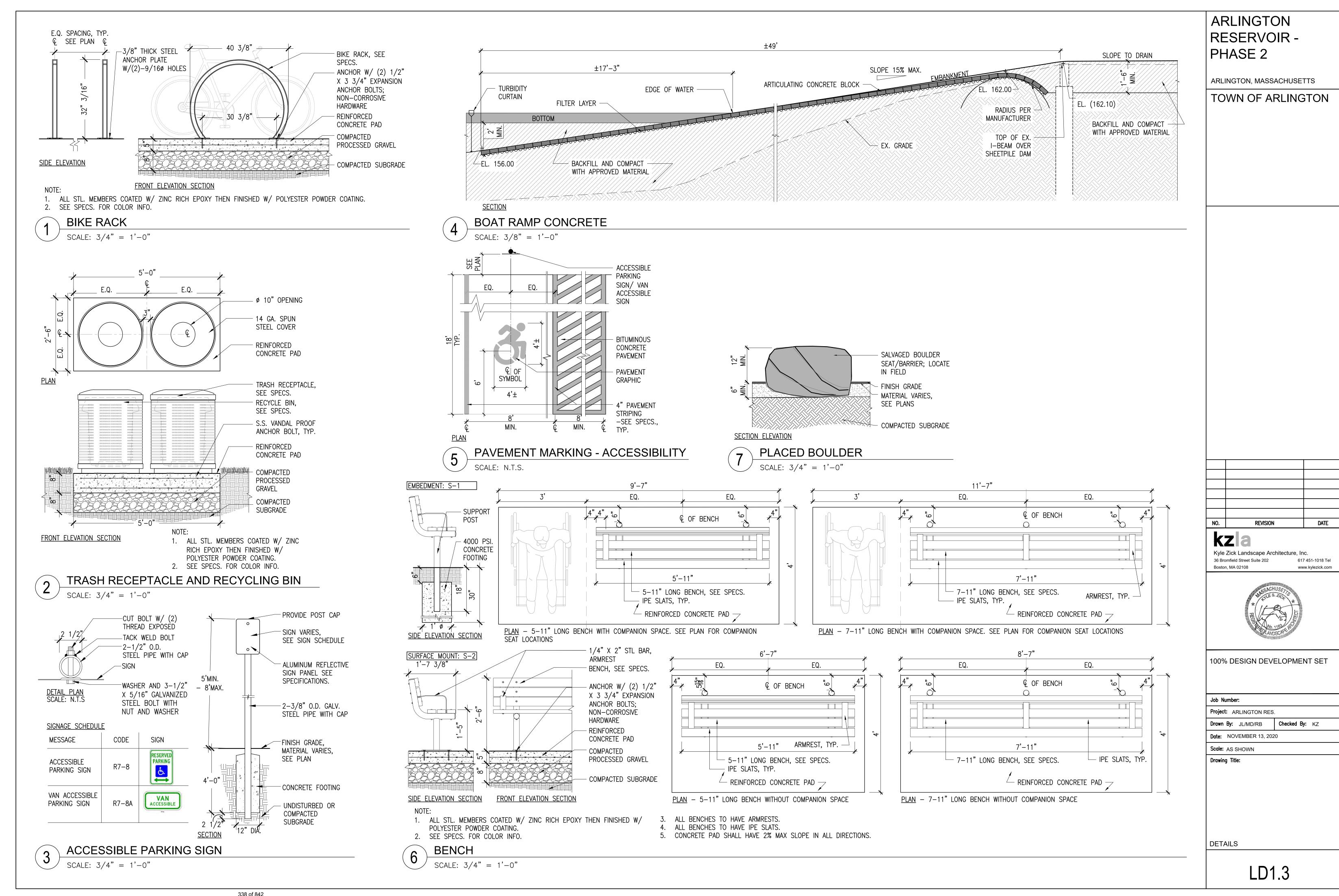


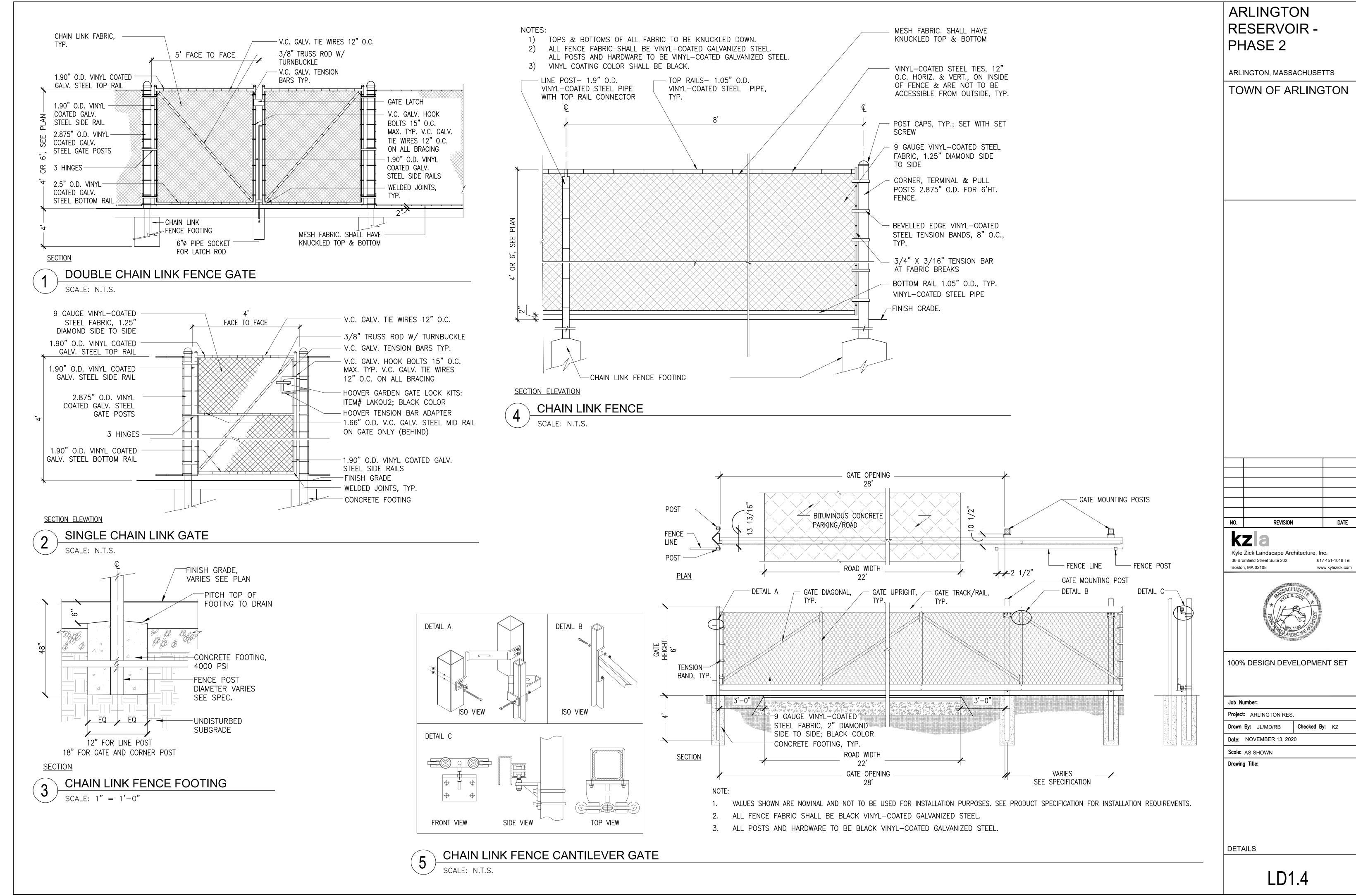
- 1. TO PREVENT INJURY TO CRITICAL ROOT ZONES OF ADJACENT TREES, SOIL IS TO BE EXCAVATED NON—INVASIVELY A MINIMUM OF 6 INCHES USING SUPERSONIC AIR KNIFE. FABRIC AND STONE ARE TO BE INSTALLED OVER AND AROUND ROOTS. SUBGRADE SHALL BE COMPACTED TO THE GREATEST EXTENT POSSIBLE. ROOT PRUNING MAY BE PERFORMED BY ARBORIST AS NEEDED ON SELECTED ROOTS LESS THAN 2 INCHES IN DIAMETER PROVIDED NO MORE THAN 15% OF THE CRITICAL ROOT ZONE IS REMOVED.
- 2. WHEREVER POSSIBLE, AND WITHOUT INJURING CRITICAL ROOT ZONES OF ADJACENT TREES. CRUSHED STONE BASE SHALL RUN 6 INCHES BEYOND THE END OF THE STONEDUST PAVING. AT LEAST 2" OF STONE SHALL COVER THE TOP OF ROOTS BEFORE STONEDUST IS LAID.
- 3. WALKWAY SHALL MAINTAIN A CROSS PITCH OF NOT MORE THAN ONE AND A HALF (1.5%) PERCENT. ANY DISCREPANCY NOT ALLOWING THIS TO OCCUR SHALL BE REPORTED TO LANDSCAPE ARCHITECT PRIOR TO CONTINUING WORK.

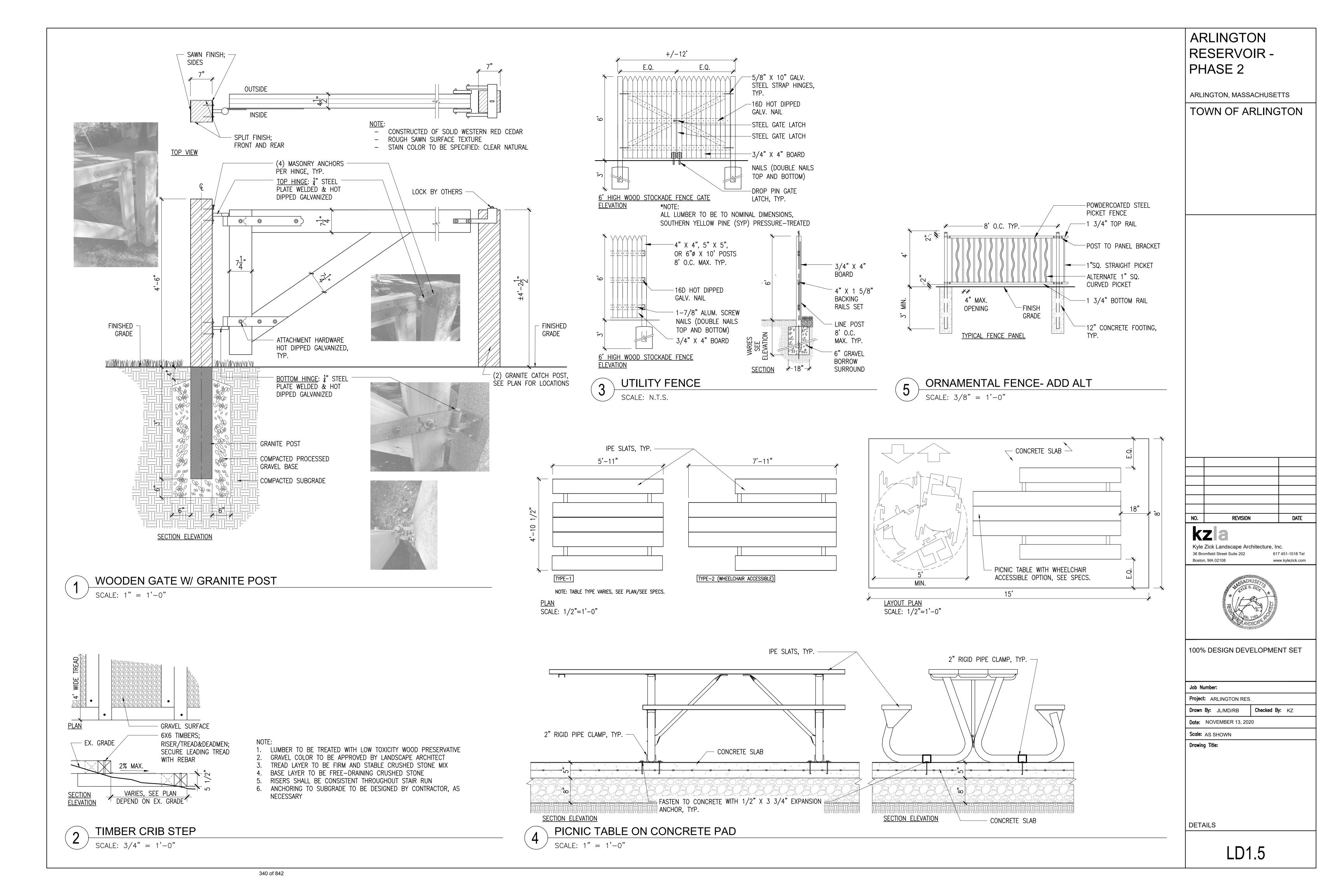
STABILIZED CRUSHED GRANITE PAVEMENT OVER TREE ROOTS

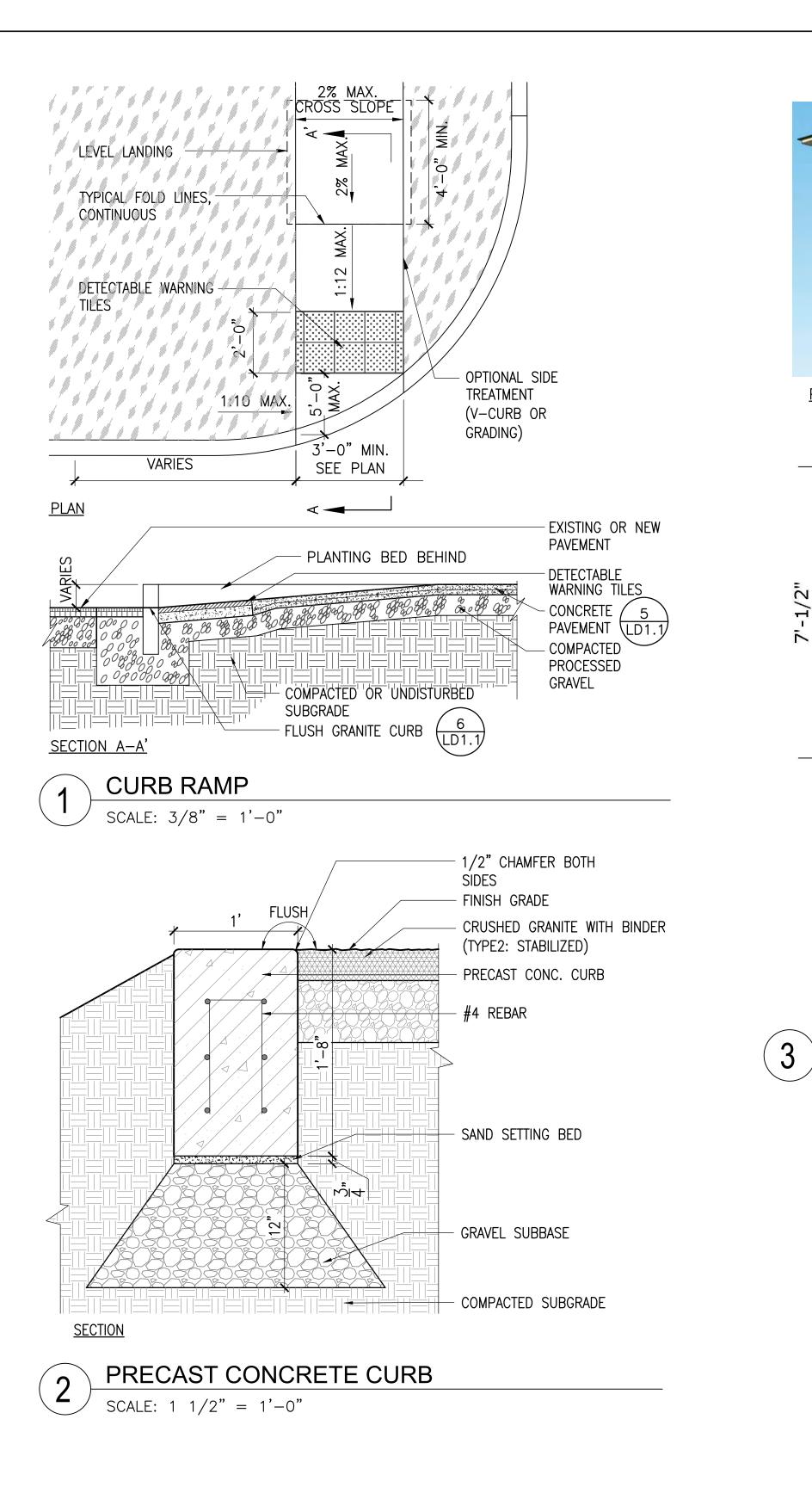
SCALE: 1" = 1'-0"

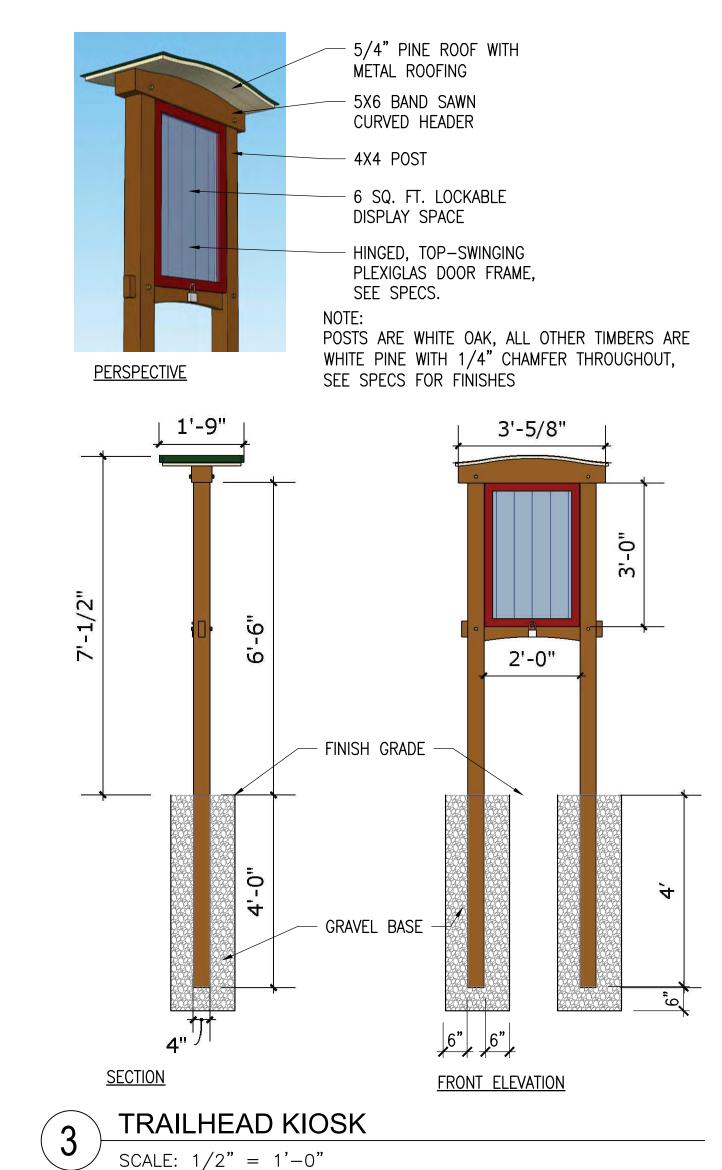












ARLINGTON RESERVOIR -PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO. REVISION DATE

KZKyle Zick Landscape A

Kyle Zick Landscape Architecture, Inc.
36 Bromfield Street Suite 202 617 451-1018 Tel
Boston, MA 02108 www.kylezick.com



100% DESIGN DEVELOPMENT SET

Job Number:

Project: ARLINGTON RES.

Drawn By: JL/MD/RB Checked By: KZ

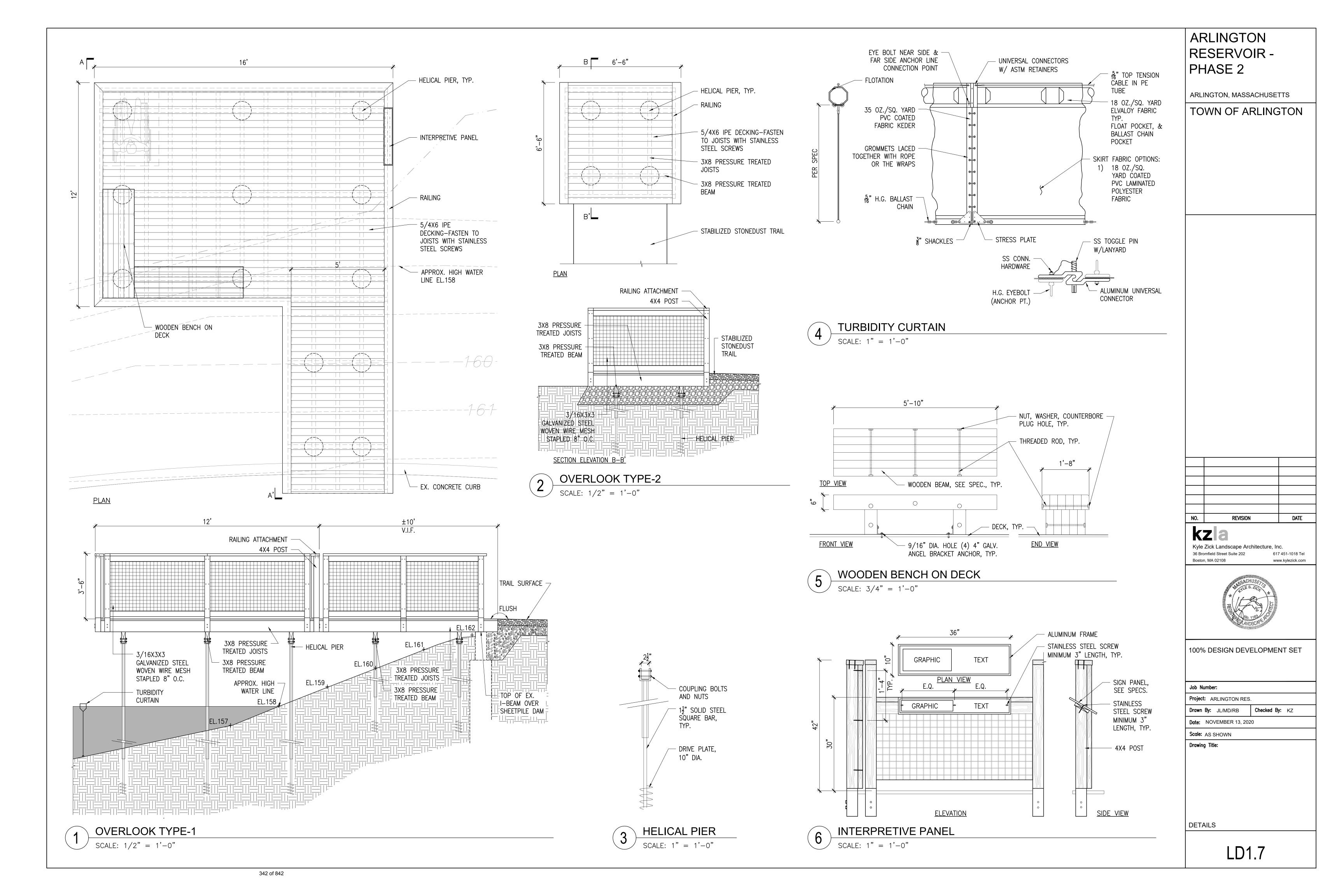
Date: NOVEMBER 13, 2020

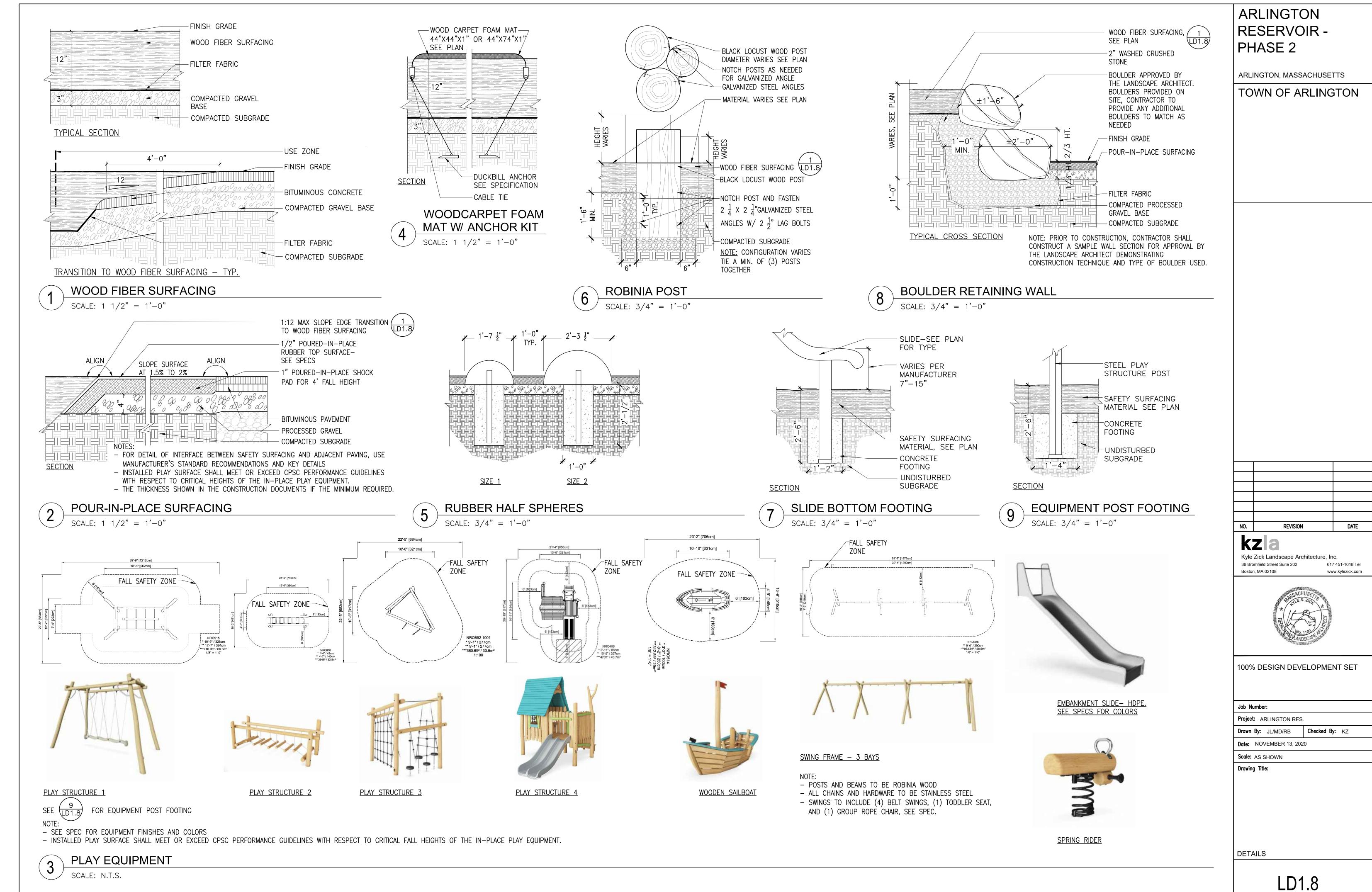
Scale: AS SHOWN

Drawing Title:

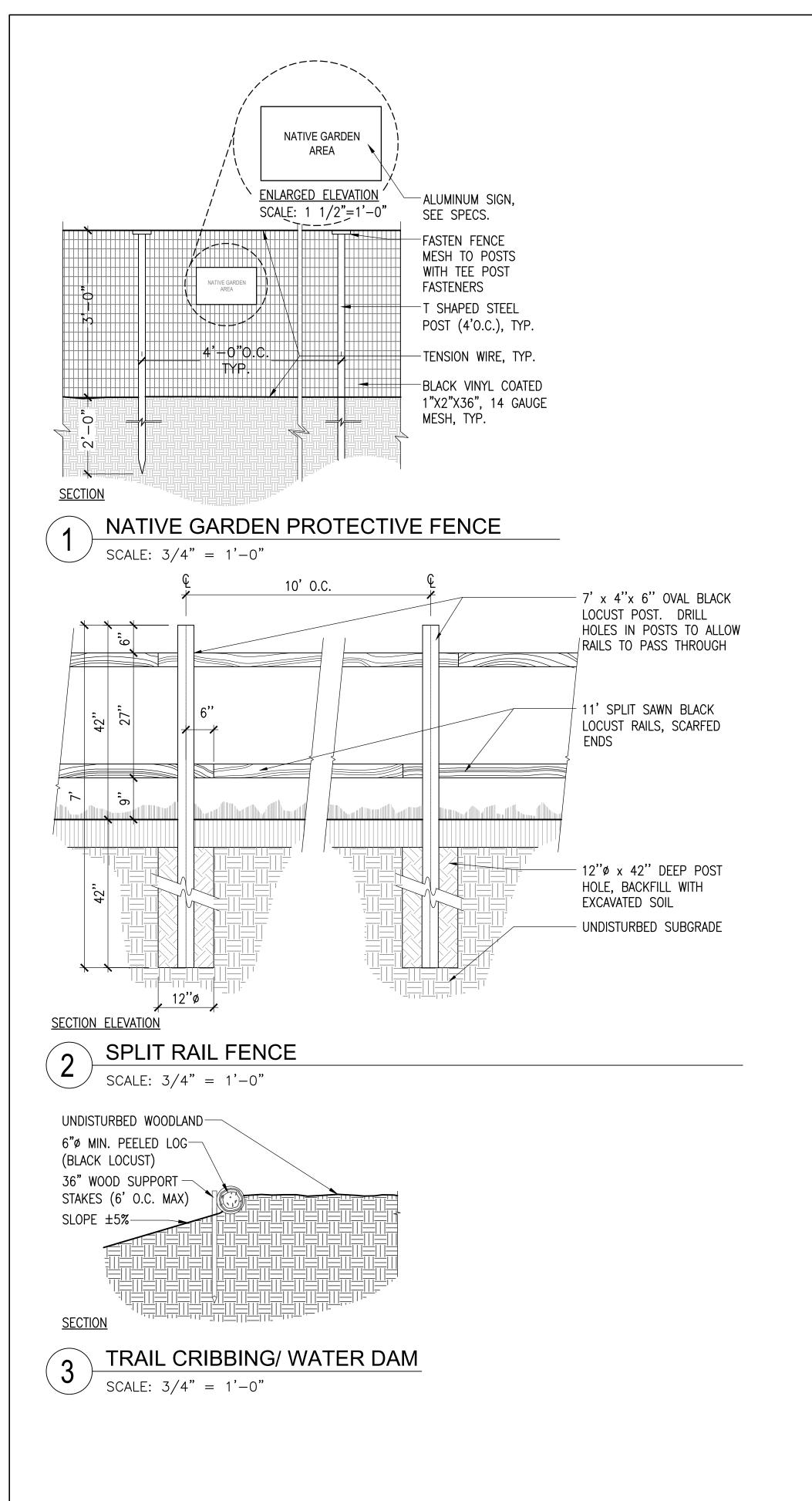
DETAILS

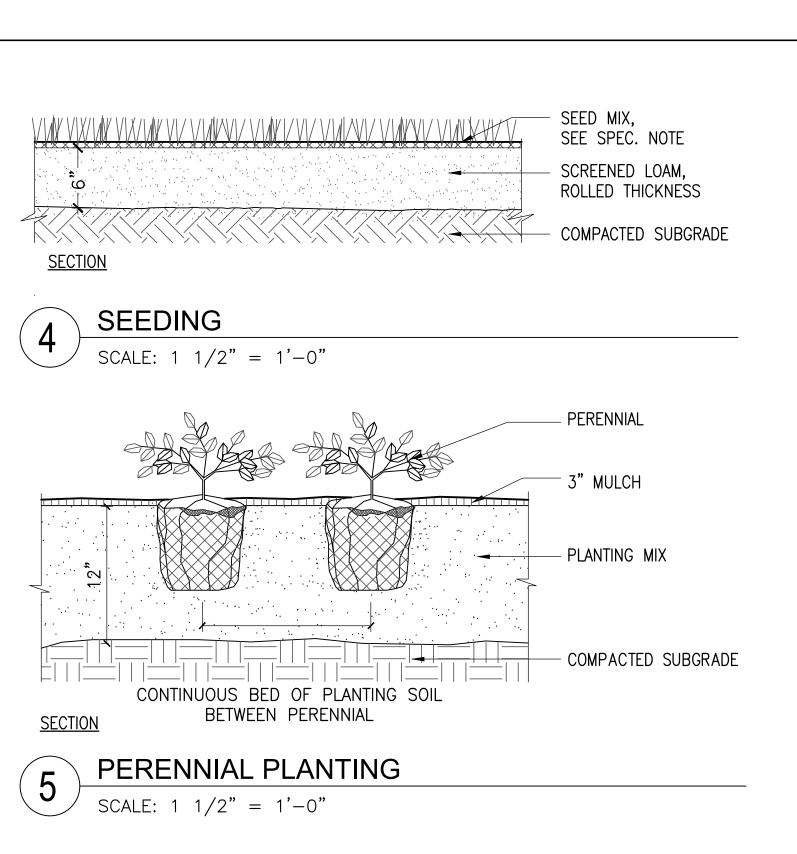
LD1.6

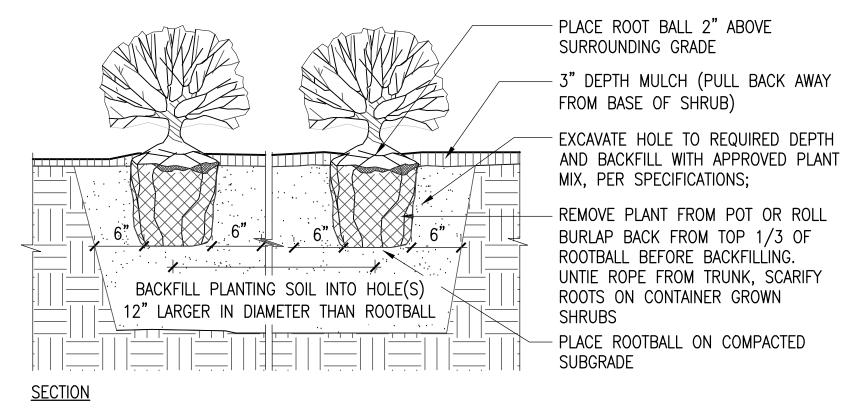




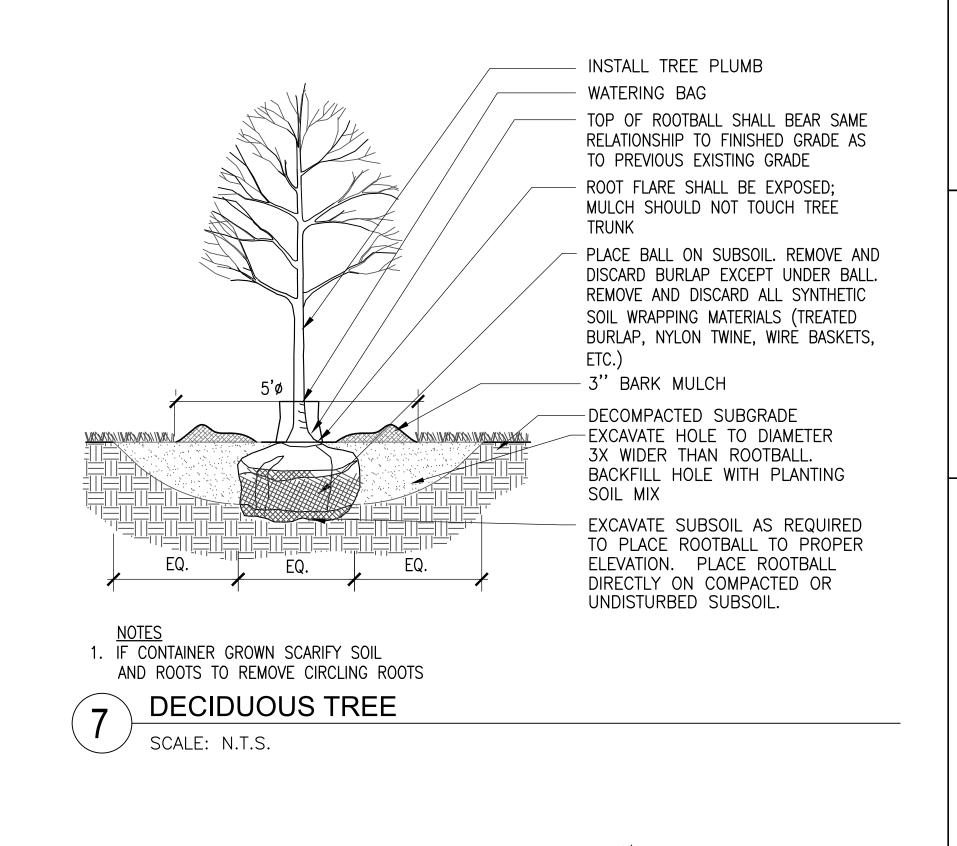
343 of 842

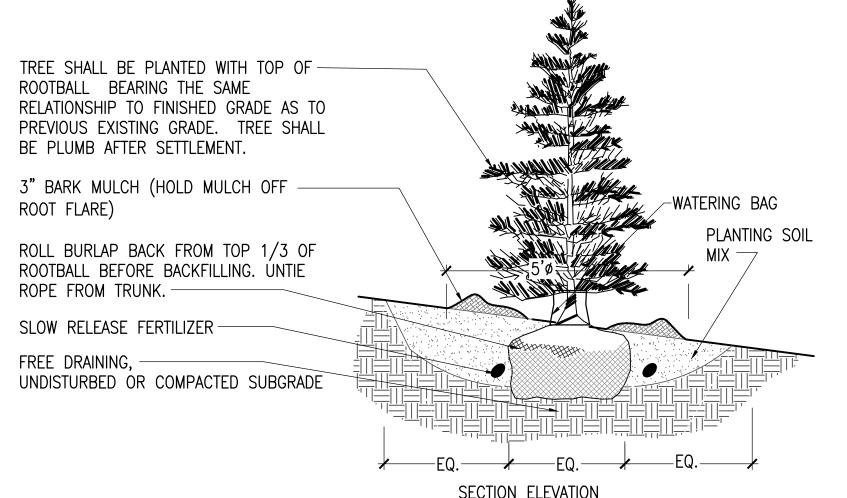


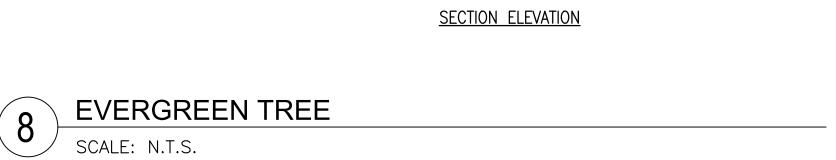


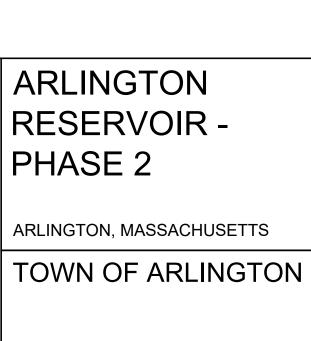


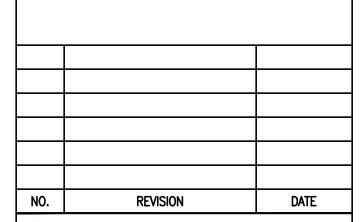












KZ a

Kyle Zick Landscape Arch

Kyle Zick Landscape Architecture, Inc.
36 Bromfield Street Suite 202 617 451-1018 Tel
Boston, MA 02108 www.kylezick.com

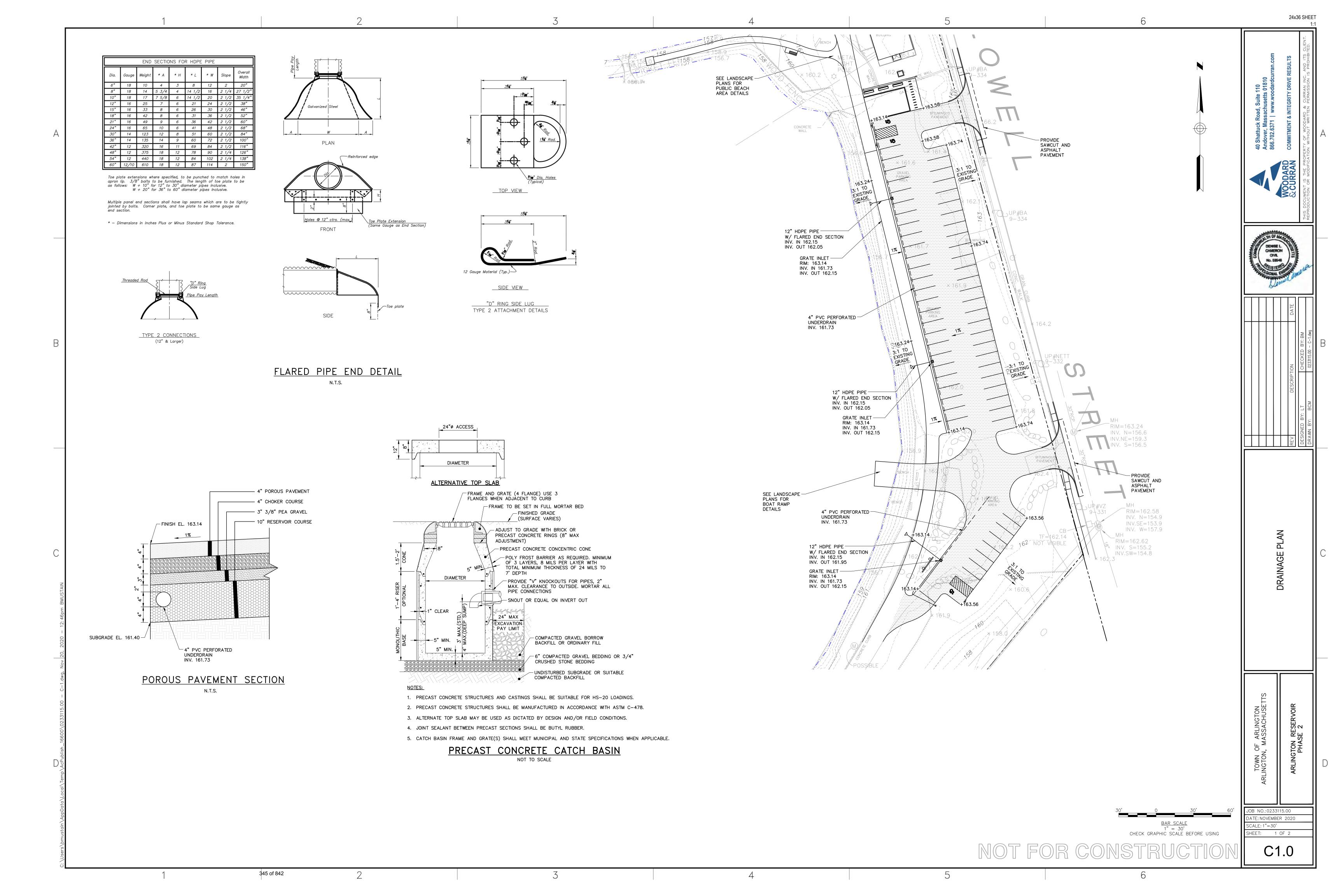


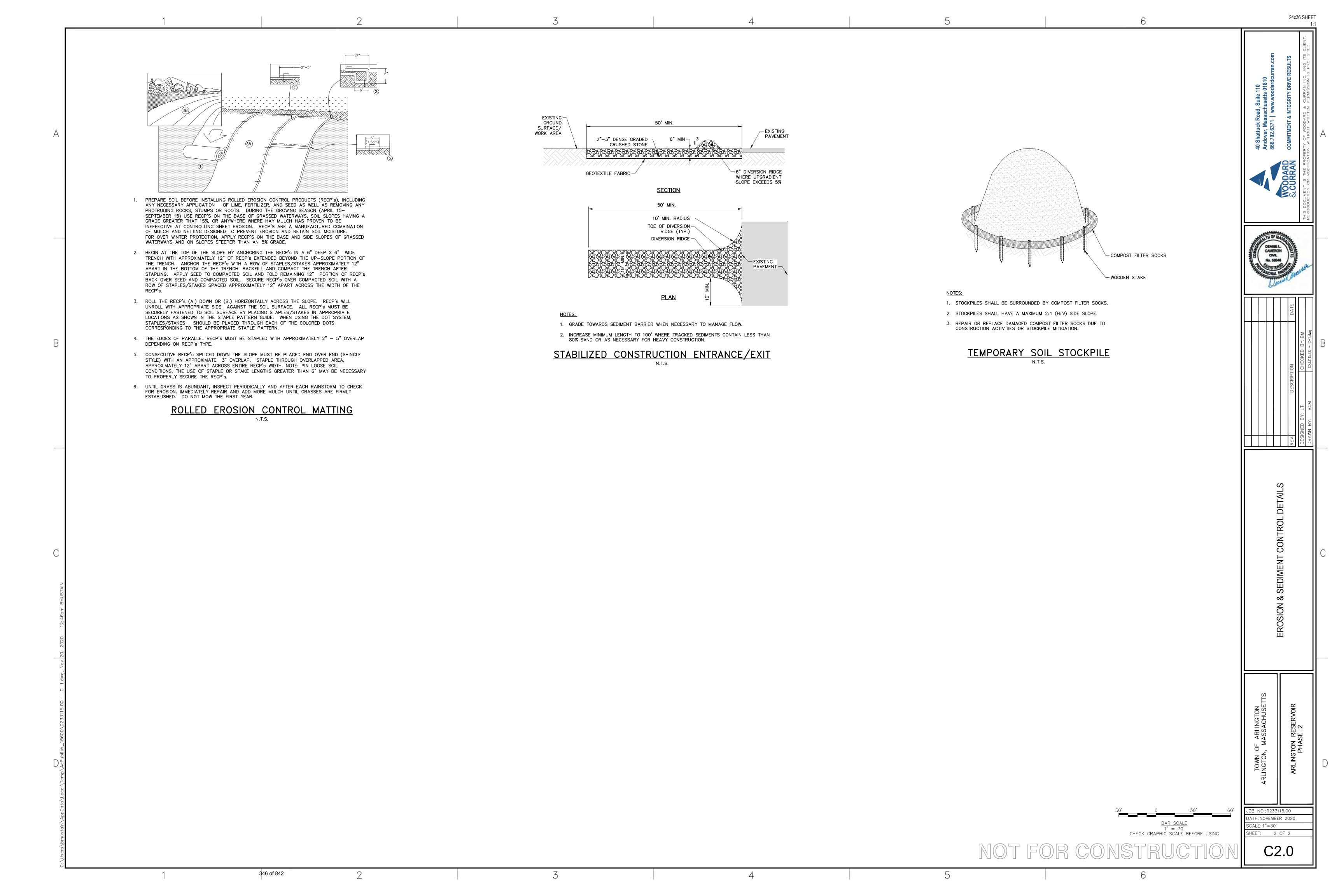
100% DESIGN DEVELOPMENT SET

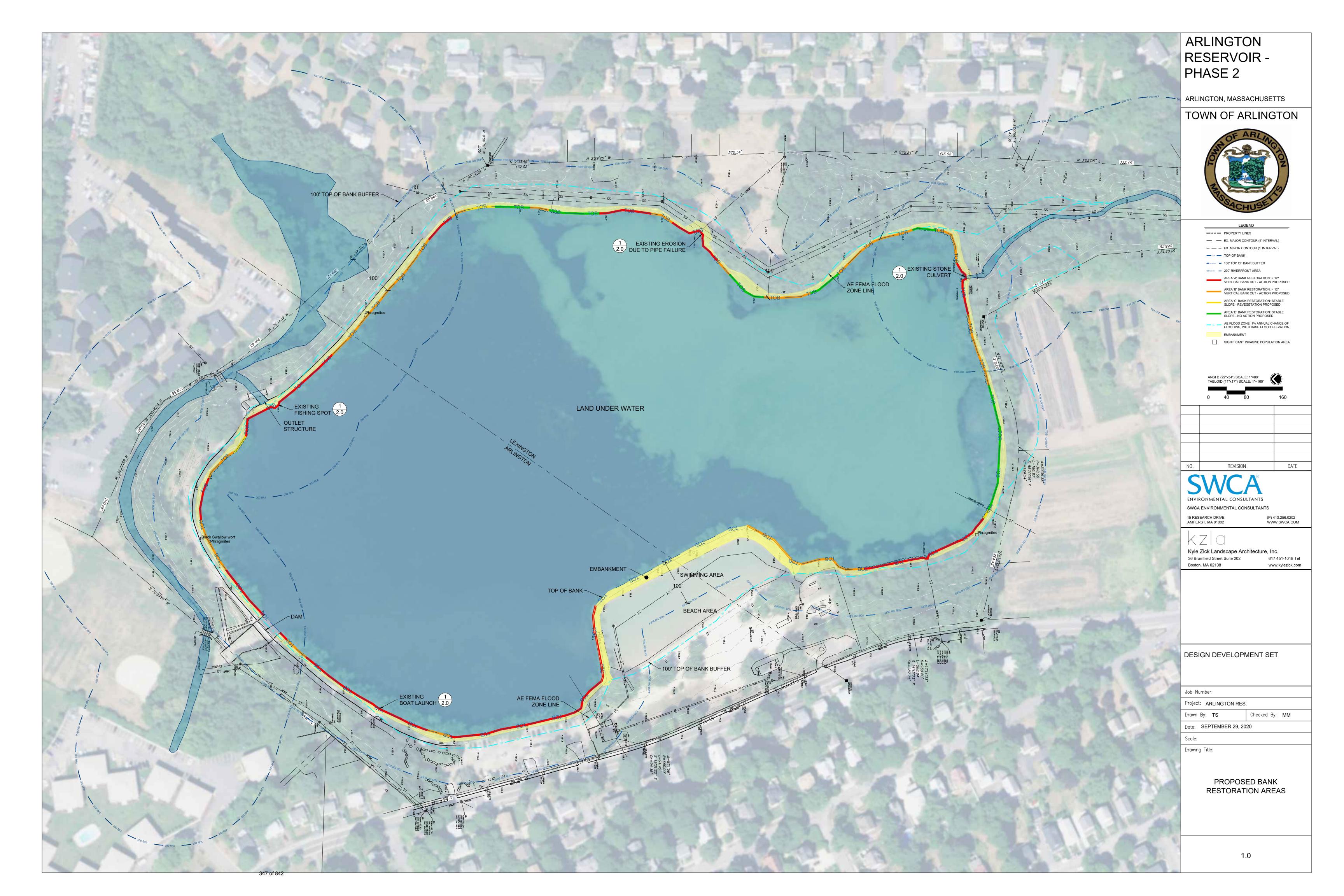
By: JL/MD/RB Checked B NOVEMBER 13, 2020	y: KZ
NOVEMBER 13, 2020	
AS SHOWN	
g Title:	

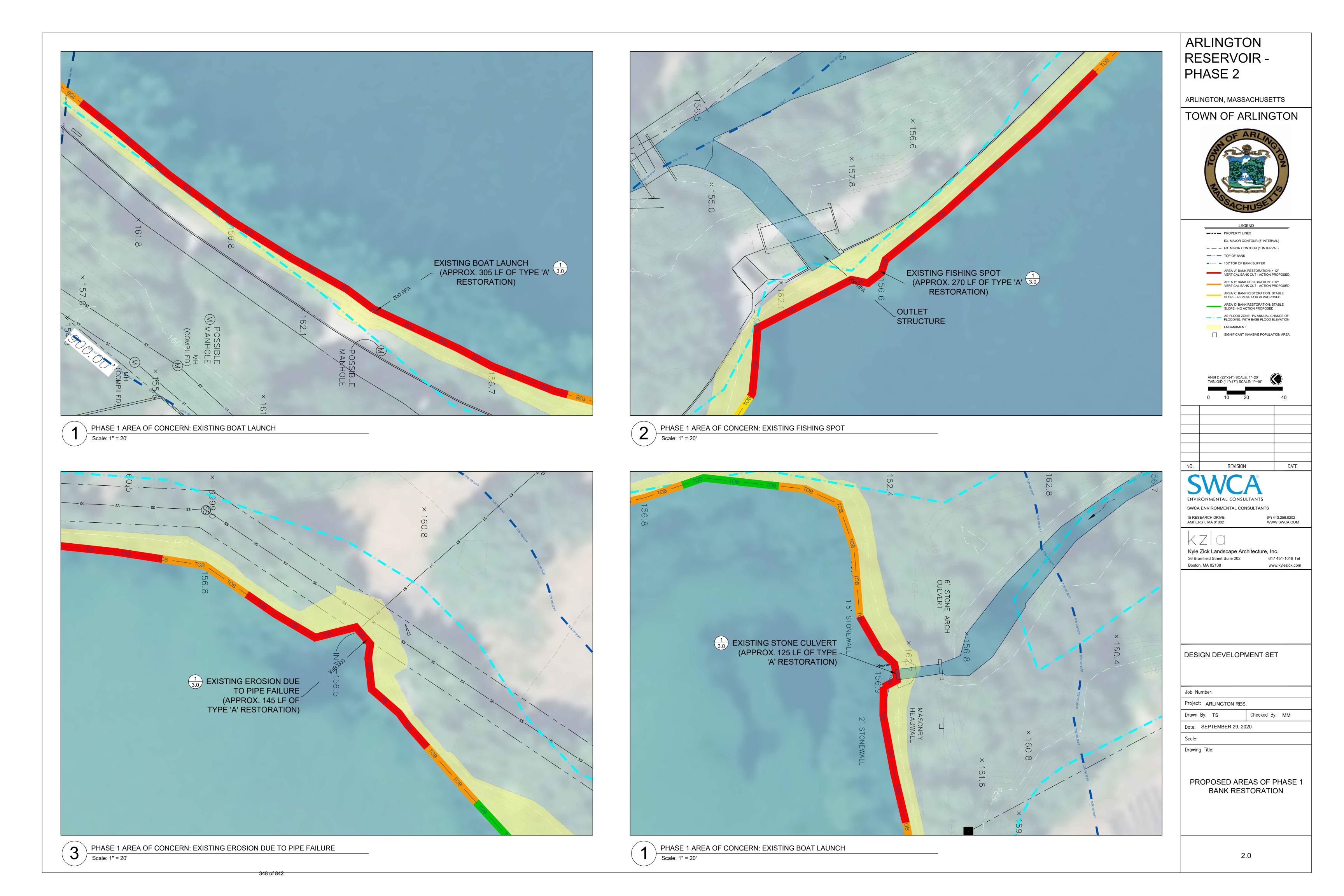
LD1.9

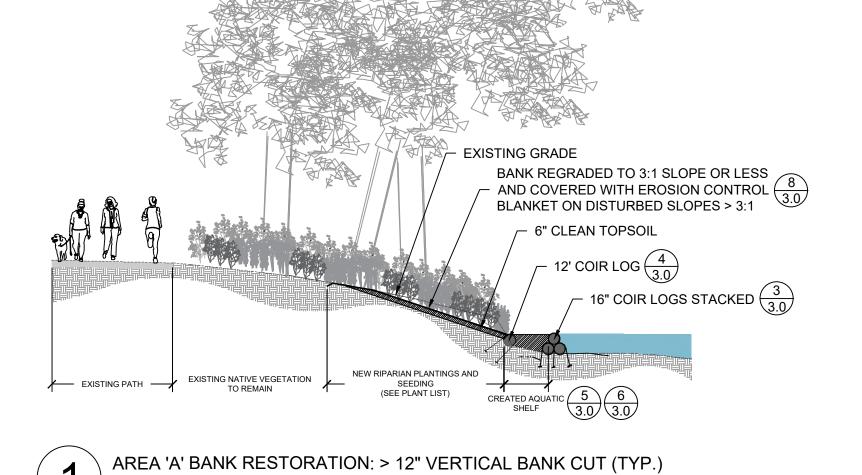
DETAILS



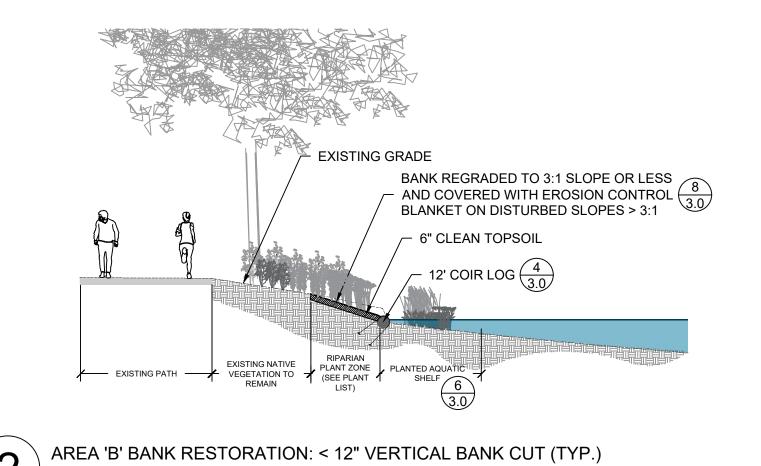




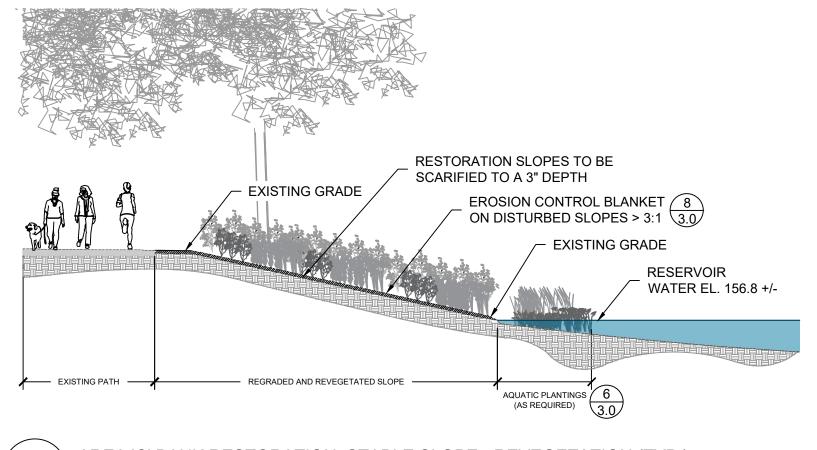


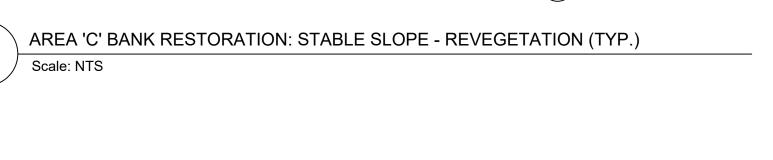


Scale: NTS



Scale: NTS





ARLINGTON RESERVOIR -PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON



NO. REVISION DATE

ENVIRONMENTAL CONSULTANTS
SWCA ENVIRONMENTAL CONSULTANTS

15 RESEARCH DRIVE (P) 413.256.0202 AMHERST, MA 01002 WWW.SWCA.COM

Kyle Zick Landscape Architecture, Inc.
36 Bromfield Street Suite 202 617 451-1018 Tel
Boston, MA 02108 www.kylezick.com

DESIGN DEVELOPMENT SET

Job Number:

Project: ARLINGTON RES.

Drawn By: TS Checked By: MM

Date: SEPTEMBER 29, 2020

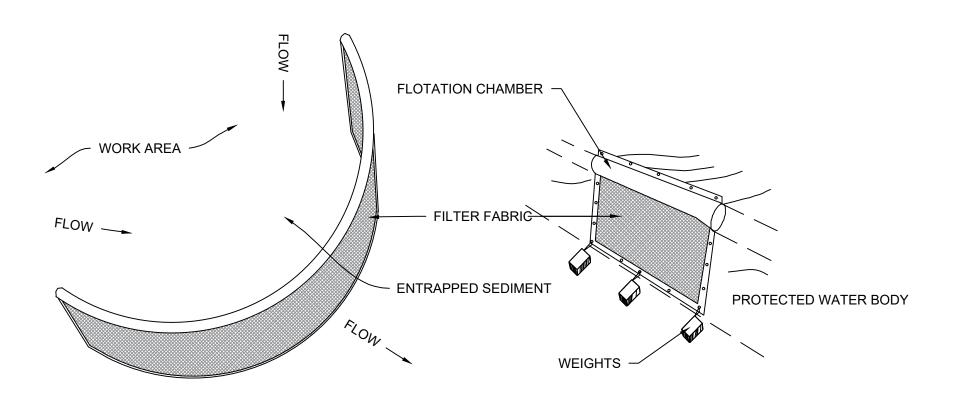
Scale:

Drawing Title:

BANK RESTORATION

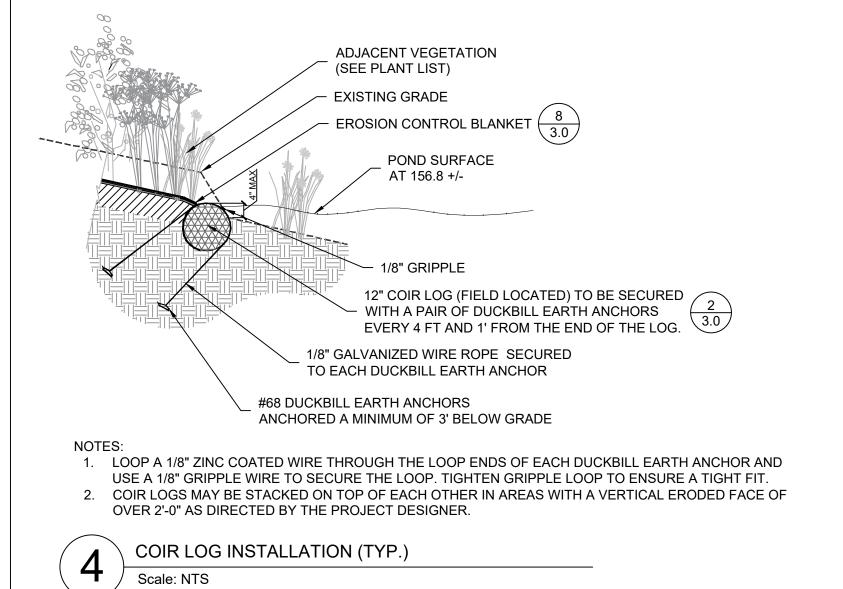
SECTIONS

3.0



NOTE: TURBIDITY CURTAIN TO BE TEMPORARILY INSTALLED SURROUNDING ANY BANK OR BOAT RAMP WORK WHICH WILL DISTURB SOILS NEXT TO OPEN WATER. ONCE SUSPENDED SEDIMENT HAS CLEARED, THE TURBIDITY CURTAIN MAY BE REMOVED.

TURBIDITY CURTAIN DETAIL FOR IN-WATER SEDIMENT CONTROL (TYP.)



PROTECTED RESOURCE AREA

UNDISTURBED SOIL

BIODEGRADABLE MATERIAL

STRAW SHALL BE CLEAN AND FREE OF VIABLE SEED
 WATTLE CASING SHALL BE BURLAP OR SIMILAR

2"X2"X3' WOOD STAKES, EVERY

AREA OF DISTURBANCE -

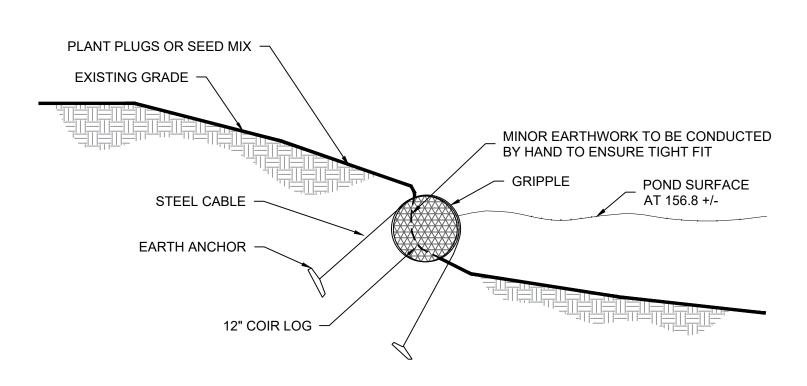
5' O.C. PER STRAW WATTLE

SET 3" BELOW GRADE

Scale: NTS

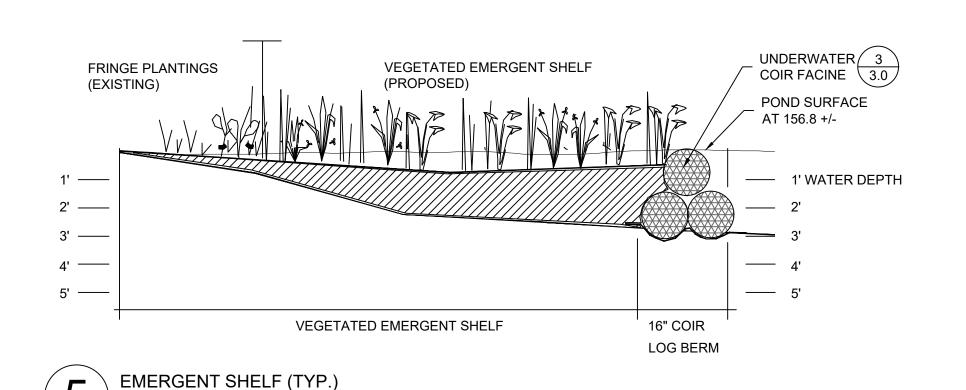
STRAW WATTLE EROSION CONTROL

STRAW WATTLES TO BE



COIR FASCINE INSTALLATION (TYP.)

Scale: NTS



OVERLAP COIR MAT 8" MINIMUM
TOE FABRIC INTO SLOPE
A MINIMUM 2'-0"
SLOPE

70% STRAW, 30% COIR EROSION CONTROL
FABRIC ON SIDE SLOPES. TOED INTO SOIL (MIN 2'
ON THE TOP AND BOTTOM) AND STAPLE DEVERY
12" ON THE EDGES AND 18" O.C. IN THE MIDDLE

TOE FABRIC INTO SOIL

TOE FABRIC INTO SOIL A
MIN. OF 2'-0"

Scale: NTS

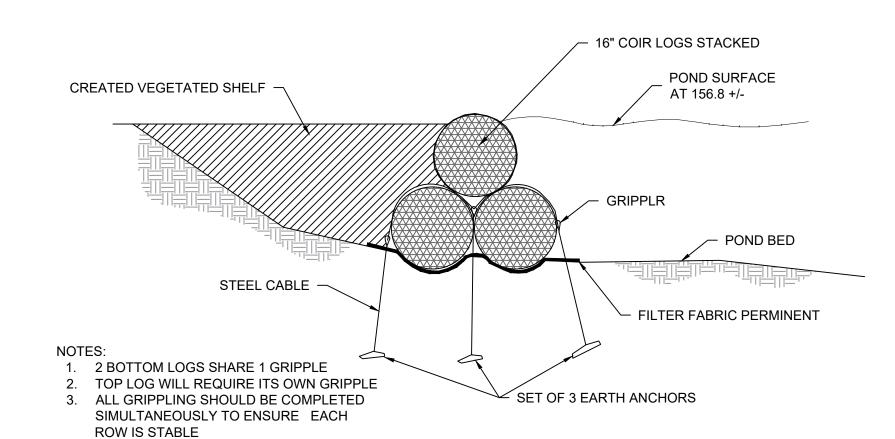
BIODEGRADABLE EROSION CONTROL FABRIC SLOPE STABILIZATION DETAIL

Scale: NTS

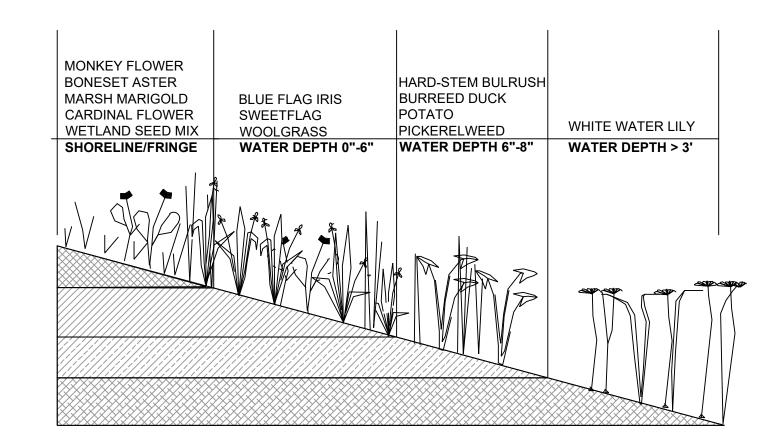
EROSION CONTROL FABRIC NOTES:

1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS TO ENSURE THAT THE EROSION CONTROL FABRIC WILL HAVE GOOD SOIL CONTACT.

- 2. APPLY PERMANENT SEEDING BEFORE PLACING EROSION CONTROL FABRIC.
- LAY FABRIC LOOSELY AND STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.
- 4. STAPLE FABRIC WITH 6" STAPLES. STAPLE FABRIC EVERY 12" ON SIDES, TOP AND BOTTOM. 18" O.C. IN THE MIDDLE OF THE FABRIC. (PER MANUFACTURES SPECIFICATIONS)
- 5. THE EROSION CONTROL FABRIC TO BE INSTALLED IN SECTIONS RUNNING FROM THE TOP TO THE BOTTOM OF THE SLOPE, ALONG THE ENTIRE AREAS AS SHOWN ON THE PLAN (PER MANUFACTURES SPECIFICATIONS)
- 6. EROSION CONTROL FABRIC SHALL USE BIODEGRADABLE (NON-PLASTIC) NETTING
- 7. TO BE USED ONLY IN AREAS OF TEMPORARY SOIL DISTURBANCE ON SLOPES ADJACENT TO THE POND.
- 8. FLAT SURFACES SHALL RECEIVE STRAW MULCH APPLIED TO THE GROUND SURFACE AT A RATE OF 2,500 LBS./ACRE.



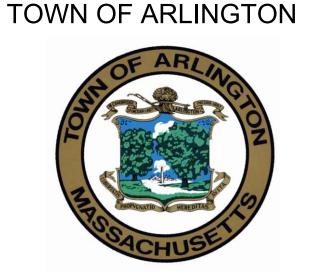






ARLINGTON RESERVOIR -PHASE 2

ARLINGTON, MASSACHUSETTS



NO. REVISION DATE

ENVIRONMENTAL CONSULTANTS

SWCA ENVIRONMENTAL CONSULTANTS

15 RESEARCH DRIVE
AMHERST, MA 01002

(P) 413.256.0202

WWW.SWCA.COM

Kyle Zick Landscape Architecture, Inc.
36 Bromfield Street Suite 202 617 451-1018 Tel
Boston, MA 02108 www.kylezick.com

DESIGN DEVELOPMENT SET

Job Number:

Project: ARLINGTON RES.

Drawn By: TS Checked By: MM

Date: SEPTEMBER 29, 2020

Scale:

Drawing Title:

BANK RESTORATION DETAILS

4.0

050 -6040

EROSION CONTROL PLAN AND CONSTRUCTION SEQUENCING

EROSION AND SEDIMENT CONTROL METHODS FOR THE PROJECT INCLUDE STRUCTURAL AND STABILIZATION PRACTICES. STRUCTURAL PRACTICES INVOLVE THE CONSTRUCTION OF DEVICES TO DIVERT AND LIMIT RUNOFF. STABILIZATION PRACTICES WILL BE IMPLEMENTED TO COVER EXPOSED SOIL SO THAT DISCHARGE OF SEDIMENT IS MINIMIZED. AN ADEQUATE STOCKPILE OF EROSION CONTROL MATERIALS WILL BE MAINTAINED AT THE PROJECT SITE IN THE EVENT OF AN EMERGENCY OR ROUTINE REPAIR.

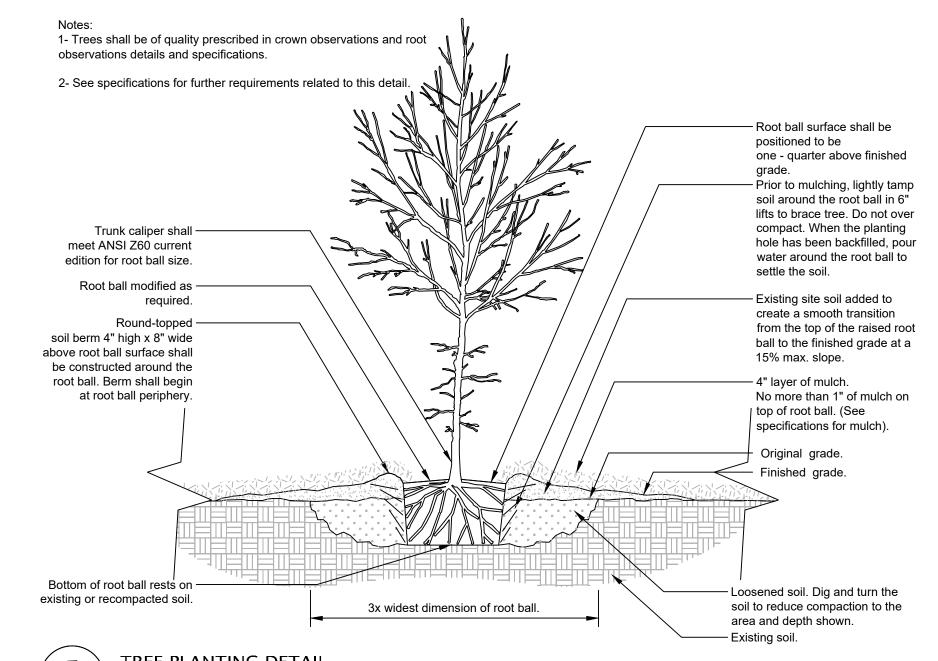
TO FURTHER MINIMIZE SEDIMENT LOSS ON THE SITE, A GENERAL CONSTRUCTION SEQUENCE PLAN HAS BEEN DEVELOPED. THE FOLLOWING ARE PROCEDURES TO BE FOLLOWED:

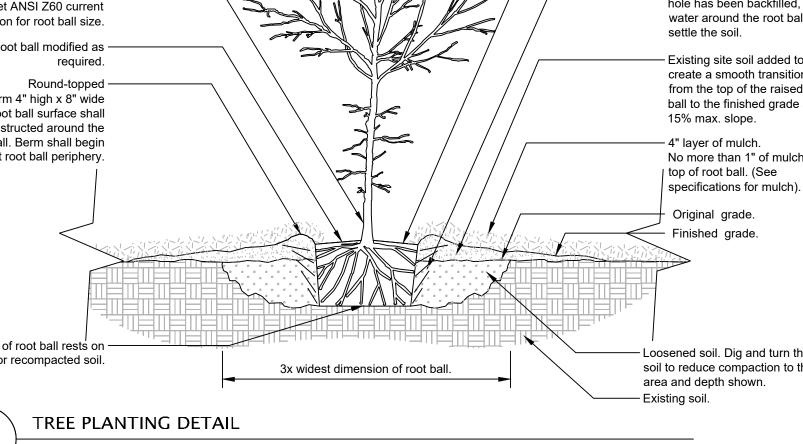
- 1. ALL VEHICLES AND EQUIPMENT BROUGHT TO THE PROJECT SITE SHALL BE CLEAN AND FREE OF INVASIVE PLANT MATERIAL.
- 2. THE WETLAND SPECIALIST SHALL MARK OUT RESOURCE BOUNDARIES IN IMPACT/RESTORATION AREAS IN THE FIELD PRIOR TO CONSTRUCTION.
- 3. PRIOR TO ANY SITE GRADING OR SITE WORK, THE CONTRACTOR SHALL INSTALL ALL SEDIMENT AND EROSION CONTROLS AS SHOWN ON THE RESTORATION PLAN, PLUS ANY ADDITIONAL CONTROLS REQUESTED BY THE WETLAND SPECIALIST BASED ON SITE CONDITIONS TO PREVENT SEDIMENT FROM LEAVING THE SITE OR FURTHER ENCROACHING INTO WETLANDS AND THE RESERVOIR.
- 4. THE CONTRACTOR FOREMAN SHALL BE DESIGNATED AS THE ON-SITE INDIVIDUAL RESPONSIBLE FOR THE DAILY MONITORING AND MAINTENANCE OF ALL SEDIMENT AND EROSION CONTROLS. ANY BREACH OR FAILURE IN SEDIMENT CONTROLS SHALL BE IMMEDIATELY REPAIRED OR REPLACED. SEDIMENT BUILD-UP BEHIND ANY EROSION CONTROL BARRIER SHALL BE REMOVED WHENEVER SEDIMENT HAS ACCUMULATED TO 3-INCHES IN DEPTH.
- 5. THE CONTRACTOR SHALL INCORPORATE PERMANENT EROSION CONTROL FEATURES, PERMANENT SLOPE STABILIZATION, AND VEGETATION INTO THE PROJECT PLANS AT THE EARLIEST PRACTICAL TIME TO MINIMIZE THE NEED FOR TEMPORARY CONTROLS.
- 6. ANY AREA DISTURBED WITHIN THE LIMIT OF BANK WORK IS TO BE SEEDED WITH NEW ENGLAND SEMI-SHADE GRASS AND FORBS SEED MIX UNLESS SPECIFIED OTHERWISE IN THE PLANTING PLAN. THE GROUND SURFACE SHALL BE SCARIFIED PRIOR TO SEEDING. AFTER SEEDING, STRAW MULCH SHALL BE APPLIED TO THE GROUND SURFACE AT A RATE OF 2,500 LBS./ACRE. SEEDED AND/OR PLANTED SLOPES GREATER THAN 3:1 SHALL BE COVERED WITH A BIODEGRADABLE EROSION CONTROL BLANKET SPECIFIED IN THE PLANS.
- 7. THE CONTRACTOR SHALL MAINTAIN TEMPORARY EROSION AND SEDIMENTATION CONTROL SYSTEMS IN GOOD CONDITION UNTIL THE SITE IS STABLE, AS VERIFIED BY THE WETLAND SPECIALIST. ONCE THE SITE IS STABLE, THE SEDIMENT AND EROSION CONTROLS MAY BE REMOVED UNDER THE DIRECTION OF THE
- 8. SHOULD ANY EROSION CONTROL BLANKET BE UTILIZED, THEY SHALL BE COMPRISED OF NON-SYNTHETIC MATERIALS (E.G., JUTE MATTING). NO EROSION CONTROL BLANKETS COMPOSED OF PLASTIC-BASED MATERIALS SHALL BE USED.

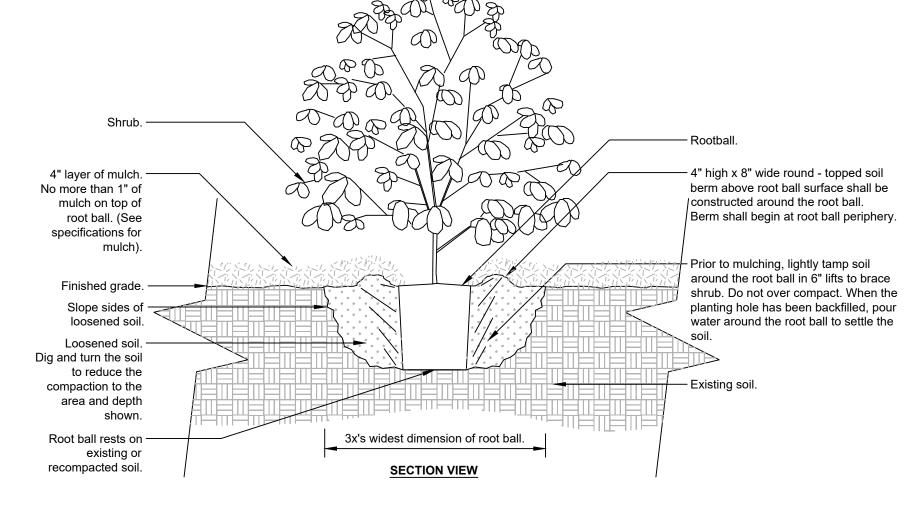
- 9. THE PURPOSE OF THIS RESTORATION PLAN IS TO IMPROVE BANK STABILITY OF ARLINGTON RESERVOIR BY REDUCING AND CONTROLLING SEDIMENTATION, RESTORING ERODED BANKS, AND ERADICATING NUISANCE VEGETATION.
- 10. THIS RESTORATION PLAN INCLUDES THREE ACTION OPTIONS DEPENDING ON THE EXTENT OF EXISTING EROSION CONDITIONS OBSERVED IN THE FIELD. BANK RESTORATION OPTIONS ADDRESS ONE OF THREE CONDITIONS A) VERTICAL BANK EROSION GREATER THAN 12 INCHES IN HEIGHT FROM THE WATER LINE, B) VERTICAL BANK EROSION LESS THAN 12 INCHES IN HEIGHT FROM THE WATER LINE, AND C) STABLE BANK EDGES WITH SLOPES DENUDED OF VEGETATION. AREAS INDICATED AS D) WERE OBSERVED TO BE STABLE AND SUFFICIENTLY VEGETATED AND REQUIRE NO ACTION.
- 11. ERODED PORTIONS OF POND EDGES ARE TO BE RESTORED WITH 12" BIODEGRADABLE COIR LOGS. COIR LOGS WILL BE INSTALLED BY HAND AND ASSOCIATED MINOR EARTHWORK WILL ALSO BE COMPLETED BY HAND OR WITH LIGHT MACHINERY. AREA OF RESERVOIR EDGES IMMEDIATELY UPGRADIENT OF COIR LOGS TO BE REVEGETATED AS NEEDED.
- 12. INVASIVE RIPARIAN AND AQUATIC WEEDS AND NUISANCE VEGETATION ARE TO BE REMOVED. REMOVAL TO BE CONDUCTED BY "HYDRO-RAKE" AND CHEMICAL TREATMENTS.
- 13. A FRIABLE "PLANTING BED" CONSISTENCY SHALL BE PREPARED. ANY COMPACTION CAUSED BY EXCAVATION SHALL BE ALLEVIATED.
- 14. THE RESTORATION AREAS ARE TO BE PLANTED WITH NATIVE WOODY SPECIES, THEN SEEDED WITH NATIVE SEED. (SEE PLANT LIST). PLANT SUBSTITUTIONS DUE TO COMMERCIAL AVAILABILITY OR HYDROLOGIC CONDITIONS MUST BE APPROVED BY THE WETLAND SPECIALIST.
- 15. THE EROSION CONTROL BARRIER BETWEEN THE RESERVOIR AND RESTORATION AREAS SHALL BE REMOVED UPON STABILIZATION OF THE RESTORATION AREAS AND THE AREA RAKED TO ELIMINATE ANY BERM THAT MAY BE PRESENT BETWEEN THE RESOURCE RESTORATION AREAS AND THE ADJACENT BVW OR RESERVOIR. ANY BARE SOIL THAT RESULTS FROM THE REMOVAL OF THE EROSION CONTROLS SHALL BE SEEDED WITH THE SPECIFIED SEED MIX. ALL STAKES AND TWINE SHALL BE REMOVED.

SEEDING GUIDANCE

- 16. SEED METHODOLOGY: THE FOLLOWING METHODOLOGY PROVIDES SEQUENCING FOR ESTABLISHING THE SEED MIXES PRESCRIBED ON IN THE PLANS. THIS PROCESS SHOULD BEGIN FOLLOWING FINAL GRADING. THIS METHODOLOGY DOES NOT SPECIFY A TEMPORARY COVER CROP. A COVER CROP MAY BE NEEDED TO STABILIZE THE SITE DEPENDING ON WEATHER CONDITIONS AND CONSTRUCTION TIMING RELATIVE TO THE SEASONS AND THE IDEAL TIME FRAME FOR ESTABLISHING THE SEEDED AREAS. THE BEST TIME TO SEED FOR THIS PROJECT IS IN THE SPRING WHEN THE SOILS ARE AT A NORMAL MOISTURE CONTENT LEVEL (MOIST, NOT SATURATED) AND NO LATER THAN JUNE 30. WEATHER FORECASTS SHOULD BE MONITORED AS OCCASIONAL WATERING MAY BE NECESSARY IF A DRY SPRING SEASON OCCURS. THE SEEDING SEQUENCE SHOULD BEGIN NO LONGER THAN 48 HOURS AFTER FINAL GRADING. SITE STABILIZATION TECHNIQUES SHOULD BE UTILIZED IN THIS 48-HOUR TIME PERIOD.
- 17. SOIL SCARIFICATION/ SEED BED PREPARATION: SEED BED PREPARATION IS THE PROCESS OF SCARIFYING AND LOOSENING THE SOIL SURFACE TO CREATE A LOOSE, FRIABLE, SOIL SURFACE. THE SOIL SURFACE SHOULD BE A UNIFORM PLANAR SURFACE THAT IS FLAT AND WITHOUT EXCESSIVE RIDGES, FURROWS, RUTS OR MOUNDS AND LOW SPOTS WHERE WATER CAN COLLECT. SOIL SCARIFICATION SHOULD ONLY OCCUR WHEN WEATHER. SOIL CONDITIONS, AND CONSTRUCTION PHASING ALLOWS FOR NO LONGER THAN 48 HOURS BETWEEN SCARIFICATION (THE BEGINNING OF THE SEEDING PROCESS) AND COVERING THE SEED WITH WEED FREE STRAW MULCH (NOT HAY), OR EROSION CONTROL BLANKET. THE SOIL SHOULD BE SCARIFIED TO MAXIMUM DEPTH OF 3 INCHES (SEE BELOW). DURING THIS PROCESS, AREAS WHERE COARSE GRAVEL DOMINATES THE SOIL SURFACE SHOULD BE IDENTIFIED AND AMENDED WITH FINE SANDY-SOIL COMMON BORROW GENERATED FROM ON-SITE EARTHWORK. THE IMPORTATION OF TOPSOIL SHOULD BE A LAST RESORT AND ONLY USED AS AN AMENDMENT FOR "LOCALIZED" SPOTS THAT LACK THE CHARACTERISTICS OF A SOIL SEED BED.
- 18. SEED APPLICATION: A WELL-PREPARED SEED BED PROVIDES A LOOSE FRIABLE SOIL SURFACE FOR WHICH THE SEED CAN BE SOWN INTO. SEED APPLICATION IS A TWO-PART PROCESS: 1) SEED APPLICATION AT PROPER RATES PER ACRE AND 2) SOW THE SEED INTO THE SOIL ½ TO ½" DEPTH MAXIMUM. APPROPRIATE SEED RATES FOR EACH PRESCRIBED SEED MIX ARE SPECIFIED ON THE ACCOMPANYING DETAILS SHEET.
- a. SEEDING BY HAND: CHECK THE SEED LABEL PRIOR TO OPENING THE BULK BAG TO CONFIRM THE CORRECT SEED IS BEING APPLIED TO THE SPECIFIED LOCATION. THE BULK BAGS OF SEED SHOULD BE AGITATED BY HAND ON SITE TO REDISTRIBUTE THE SEEDS IN THE MATRIX BEFORE SPREADING. IN BARE AREAS A WEED FREE STRAW MULCH MAY BE USED TO COVER THE SOIL SURFACE FOLLOWING THE SEED APPLICATION.
- b. SOWING THE SEED: ONCE THE SEED IS SPREAD THE SEED MUST BE SOWN INTO THE SOIL TO THE DEPTH ABOVE TO INCREASE CHANCES OF GERMINATION BY KEEPING SOIL MOISTURE CLOSE TO THE SEED. THE SEED CAN BE SOWN BY A NUMBER OF WAYS INCLUDING "TRACKED" IN WITH A LOW PSI RUBBER TIRE OR TRACKED MACHINE, USING A YORK LANDSCAPE RAKE OR SIMILAR, OR THE TRADITIONAL MEANS OF USING A METAL LEAF RAKE.
- 19. RESEEDING: AREAS TO BE RESEEDED SHALL FOLLOW THE SAME SEEDING SEQUENCE OUTLINED ABOVE. IT IS EXPECTED THAT SOME SEEDED AREAS MAY NOT GERMINATE, BUT THAT OVER TIME THE PLANTED AREAS SHALL FILL IN THROUGH SEED PROLIFERATION AND GROWTH HABITS. AREAS LARGE ENOUGH TO BE IDENTIFIED THROUGH MONITORING AS BEING DOMINATED BY WEEDS OR OTHER INVASIVE SPECIES THAT HAVE OUT COMPETED THE SPECIFIED SEED MIX OR AREAS DEEMED UNSTABLE DUE TO LOW PLANT GROWTH SHALL BE RESEEDED ACCORDINGLY.
- 20. PLANT SUCCESSION NOTES: IT IS POSSIBLE THAT OVER TIME SOME SEEDED AREAS MIGHT BECOME DOMINATED BY NATIVE PLANT SPECIES EXISTING IN THE SOIL SEED BANK. ONE EXAMPLE OF THIS IS THE LIKELIHOOD THAT VARIOUS TYPES OF NATIVE FERNS COULD EMERGE IN SHADED AREAS. NO SPECIES OF FERNS ARE IN THE PRESCRIBED SEED MIX BUT ARE HIGHLY DESIRABLE SPECIES THAT CAN EXIST AND THRIVE IN THE IDENTIFIED PLANTING AREAS ADDING TO LANDSCAPE DIVERSITY. NATIVE SPECIES SUCH AS FERNS THAT EMERGE DUE TO BEING IN THE SOIL SEED BANK SHOULD REMAIN. THOROUGH AND REGULAR MONITORING DURING THE MATURATION OF THE ESTABLISHMENT AREAS IS A KEY COMPONENT TO BALANCING AREAS TO BE RESEEDED AND AREAS WHERE SUCCESSIONAL PLANT GROWTH OF NATIVES SHOULD BE ALLOWED TO THRIVE.





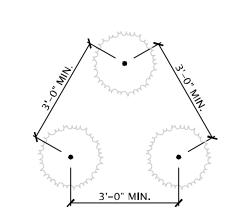


1- Shrubs shall be of quality prescribed in the root observations detail and specifications.

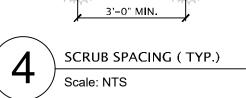
2- See specifications for further requirements related to this detail.

SHRUB PLANTING DETAIL

TREE SPACING (TYP.)



Scale: NTS



New England Semi-Shade Grass and Forbs Mix

Botanical Name	Common Name	Indicator
Elymus virginicus	Virginia Wild Rye	FACW-
Elymus canadensis	Canada Wild Rye	FACU+
Festuca rubra	Red Fescue	FACU
Chamaecrista fasciculata	Partridge Pea	FACU
Liatris spicata	Spiked Gayfeather/Marsh Blazing Star	FAC+
Onoclea sensibilis	Sensitive Fern	FACW
Aster prenanthoides (Symphyotrichum prenanthoide)	Zigzag Aster	FAC
Eupatorium fistulosum (Eutrochium fistulosum)	Hollow-Stem Joe Pye Weed	FACW
Eupatorium perfoliatum	Boneset	FACW
Juncus tenuis	Path Rush	FAC
Apply: 30 lbs/acre	,	•

NEW ENGLAND SEMI-SHADE GRASS AND FORBS MIX Scale: NTS Source: Seed mixes referenced herein are provided by New England Wetland Plants, Inc.

over Type	Abbrev.	Scientific Name	Common Name	Plant Size @ Installation	Area 'A'	Area 'B'	Area 'C'	rea 'D'
	•		Total Enhancement Area (If)		2,120	1,650	130	680
			Total Enhancement Area Approx. (sf)		31,800	24,750	1,950	10,200
rees								
	Ar	Acer rubrum	Red Maple	4'-6' ht. min.		9	3	
	Ва	Betula alleghaniensis	Yellow Birch	4'-6' ht. min.		9		
	Вр	Betula populifolia	Grey Birch	4'-6' ht. min.		9		
	Ns	Nyssa sylvatica	Black Gum	4'-6' ht. min.		9	3	
	Pd	Populus deltoides	Cottonwood	4'-6' ht. min.		9		
	Qr	Quercus rubra	Red Oak	4'-6' ht. min.		9	3	
	Sd	Salix discolor	Pussywillow	4'-6' ht. min.		9	3	
	Sn	Salix nigra	Black Willow	4'-6' ht. min.	-	9	3	
Shrubs	•							
	Ca	Clethra alnifolia	Sweet Pepperbush	3'-4' ht. min.	50	27	6	
	Cs	Cornus sericea	Red Osier Dogwood	3'-4' ht. min.	50	27	6	
	V	Ilex verticillata	Winterberry	3'-4' ht. min.	50	27	6	
	Vd	Viburnum dentatum	Northern Arrowwood	3'-4' ht. min.	50	27	6	
Herbacious							,	
- Shoreline/Fringe	Ср	Caltha palustris	Marsh Marigold	2" plug	2,100	1,800	150	
	Ер	Eupatorium perfoliatum	Boneset Aster	2" plug	2,100	1,800	150	
	Mr	Mimulus ringens	Monkey Flower	2" plug	2,100	1,800	150	
- Water Depth 0"-6"	Am	Acorus americana	Sweetflag	2" plug	2,100	1,800	150	
	Lc	Lobelia cardinalis	Cardinal Flower	2" plug	2,100	1,800	150	
	V	Iris versicolor	Blue Flag Iris	2" plug	2,100	1,800	150	
- Water Depth 6"-8"	Рс	Pontederia cordata	Pickerelweed	2" plug	1,350	1,050	450	
	Sa	Schoenoplectus acutus	Hard-stem Bulrush	2" plug	1,350	1,050	450	
	Sc	Scirpus cyperinus	Woolgrass	2" plug	1,350	1,050	450	
	SI	Sagittaria latifolia	Duck Potato	2" plug	1,350	1,050	450	
	Sm	Sparganium americanum	Burreed	2" plug	1,350	1,050	450	
- Water Depth > 3'	No	Nymphaea odorata	White Water Lily	tuber		5,220	5,850	
Seed Mix			.					
	New End	aland Erosion Control/Restorat	ion Mix For Detention Basins and Moist Sites (Lbs)	18lbs/acre	13.0	11.0	1.0	

ree quantities specified are based off the USDA New England Forest: Baseline for New England Forest Health Monitoring report.

Trees shall be installed not less than 10 feet on center and no farther than 12 feet on center. Shrubs shall be planted in clusters of 2 or 3, and shall be installed not less than 3 feet on center.

Areas within planting areas not 100% vegetated with existing herbaceous plants will be seeded with the appropriate seed mix at the manufacturers specified rate to cover the bare area.

A wetland scientist or landscape architect shall provide supervision of the plant layout.

Plant substitutions may be necessary due to commercial availability. Substitutions shall be approved by the supervising wetland scientist or landscape architect. Invasive species control semi-annually for the first two-years

Fringe and aquadic vegetation assumes an average of 3 square feet of planting area per linear foot at 12-inch on center spacing for each community

Area A woody material assumes 50% slope coverage of upland areas based on the USDA New England Forest prescribed rate of 240 trees per acre and 75% shrub cover at the prescribed spacing above Area B woody material assumes 50% slope coverage of upland areas based on the USDA New England Forest prescribed rate of 240 trees per acre and 75% shrub cover at the prescribed spacing above Area C woody material assumes 25% slope coverage of upland areas based on the USDA New England Forest prescribed rate of 240 trees per acre and 75% shrub cover at the prescribed spacing above



PLANT SCHEDULE

ARLINGTON RESERVOIR -PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON



SWCA ENVIRONMENTAL CONSULTANTS 15 RESEARCH DRIVE (P) 413.256.0202 AMHERST, MA 01002 WWW.SWCA.COM

Kyle Zick Landscape Architecture, Inc. 36 Bromfield Street Suite 202 617 451-1018 Tel Boston, MA 02108 www.kylezick.com

DESIGN DEVELOPMENT SET

Job Number: Project: ARLINGTON RES. Checked By: MM Drawn By: TS Date: SEPTEMBER 29, 2020

Drawing Title:

BANK RESTORATION DETAILS AND NOTES

5.0



STORMWATER MANAGEMENT REPORT

Arlington Reservoir – Phase 2



40 Shattuck Road | Suite 110 Andover, Massachusetts 01810 800.426.4262

woodardcurran.com COMMITMENT & INTEGRITY DRIVE RESULTS

0233115.00

Town of Arlington

Massachusetts

October 2020



TABLE OF CONTENTS

SEC	TION	PAGE	Ξ NO.
1.	PROJEC	CT DESCRIPTION	1-1
	1.1	Introduction	1-1
	1.2	Existing Conditions	
	1.	2.1 Land Cover and Soils	1-1
		2.2 Topography	
		2.3 Resource and Critical Areas	
	1.3	Proposed Project Work	1-3
2.	STORM	WATER EVALUATION	2-1
	2.1	Stormwater Modeling Methodology	2-1
	2.2	Hydraulic Model Description	
		2.1 Design Points	
		2.2 Pre-Development Conditions	
		2.3 Post-Development Conditions	
		2.4 Low Impact Development Technique – Porous Pavement	
	2.3	Peak Discharge Rates and Runoff Volumes	
3.	COMPL	ANCE WITH STORMWATER MANAGEMENT STANDARDS	3-1
	3.1	Standard 1: No New Untreated Discharges	3-1
	3.2	Standard 2: Peak Rate Attenuation	
	3.3	Standard 3: Recharge	3-1
	3.4	Standard 4: Water Quality	3-2
	3.5	Standard 5: Land Uses with Higher Potential Pollutant Loads	
	3.6 3.7	Standard 6: Critical AreasStandard 7: Redevelopment	
	3.8	Standard 7: Redevelopment	
	3.9	Standard 9: Operation and Maintenance Plan	
	3.10	Standard 10: Prohibition of Illicit Discharges	
	0.10		
		TABLES	
Table	2-1: Desi	gn Rainfall Data	2-1
Table	2-2: Pre-	and Post-Development Peak Discharge Rates	2-4
Table	2-3: Pre-	and Post-Development Runoff Volumes	2-4
		ADDENDICES	
		APPENDICES	
	ndix A:	Environmental Resource Documentation	
	ndix B:	Soils Map and Test Pit Logs	
	ndix C:	Stormwater Figures	
	ndix D:	HydroCAD Stormwater Model Reports	
	ndix E: ndix F:	Operations & Maintenance Plan Stormwater Pollution Prevention Plan	
	ndix F.	MassDEP Checklist for Stormwater Report	
, when	IGIA O.	maddel district of distributed report	



1. PROJECT DESCRIPTION

1.1 Introduction

On behalf of the Town of Arlington, Massachusetts (the Town), Woodard & Curran, Inc. (Woodard & Curran) has prepared this Stormwater Management Report for the proposed improvements to the Arlington Reservoir, located at 210 Lowell Street in Arlington, Massachusetts (the Site). The Town is proposing to revitalize the eastern shore of the Arlington Reservoir recreation area. Weston & Sampson Engineers, Inc. (Weston and Sampson), on behalf of the Town of Arlington, developed a Master Plan for the Reservoir in 2018. This proposed project encompasses Phase 2 of the Master Plan and improvements include installing porous pavement over the approximately 0.5-acre gravel parking area in the southern portion of the site, installation of new ADA-accessible pathways, a new play area, a multi-use court, a boat launch, and several other Site improvements as shown on the Post-Development Watershed Figure located in **Appendix C**. The impacts of these improvements to the Site's stormwater drainage patterns are summarized in this report.

1.2 Existing Conditions

A Site Locus Plan on a United States Geological Survey (USGS) Quadrangle Map depicting the project location has been provided in **Appendix A**. Arlington Reservoir is a 65-acre man-made recreational and stormwater-control pond on the Arlington and Lexington Town border. About half of the reservoir's open water is located in the Town of Lexington, however, the Town of Arlington owns and manages the reservoir. The earthen dam around the southern edge of the Reservoir is approximately 600 yards long and up to 14 feet tall. The water within the Reservoir discharges into Mill Brook through a sluice gate.

In 1935, the Town of Arlington constructed a sandy beach on the Reservoir's eastern shore. In the late 1970s, the Town completed improvements to the beach and added an embankment to separate the swimming area from the rest of the Reservoir. The beach now includes a filtered, chlorinated swimming area with a ramp for ADA accessibility, a bathhouse, vending machines, a concession area, and a playground. The Reservoir also has a one-mile walking trail around its perimeter, open to the public throughout the year.

1.2.1 Land Cover and Soils

Land cover and soils datasets were used to develop hydrologic curve numbers. Land cover was determined by a site visit conducted on September 3, 2020 and review of aerial photography and site survey data. A more detailed examination of the existing land cover within individual drainage subcatchments can be found in section 2.2.2. All existing impervious areas located within the Town of Lexington that are proposed to be replaced with a pervious land cover are required to be considered open space in good condition for stormwater calculations purposes per Lexington's Stormwater Management Regulations.

Soil characteristics were observed during test pit evaluations conducted in August 2020 and supplemented with information obtained from the United States Department of Agriculture's (USDA's) most recent Web Soil Survey. A Site map showing soil types and hydrologic soil group classifications within the project vicinity from the USDA's Web Soil Survey is located in **Appendix B**.

Test pits were conducted by Civil Design Consultants, Inc. (CDCI) of Methuen, Massachusetts on August 6, 2020 to evaluate the subsurface soil conditions and identify the estimated seasonal high groundwater table elevation. In all four borings conducted, CDCI observed a surface layer of fill ranging from 9 to 27 inches in depth, followed by a sandy loam layer extending to the bottom of each test pit. From these test pits, it was determined that at its highest elevation in the 0.5-acre parking lot, the seasonal high groundwater table is located approximately at elevation 159.40. Woodard & Curran used this data to locate the proposed stormwater best management practices (BMPs) at elevations with at



least two feet of separation from groundwater. Bedrock was not encountered during test pitting activities. The test pit logs and location figure provided by CDCI are located in **Appendix B**.

1.2.2 Topography

Subcatchment boundaries were delineated using the site survey performed and prepared by Weston & Sampson in December 2017. Topographically, the eastern shore of the Reservoir generally slopes downward from Lowell Street towards the Reservoir, with the exception of the southern-most portion of the 0.5-acre gravel parking area, which slopes downwards towards a ditch just north of the property located at 202 Lowell Street.

In both the pre- and post-development Site conditions, stormwater travels across the Site via overland flow and discharges into one of three Design Points: Arlington Reservoir, the on-Site swimming area, and the ditch located north of 202 Lowell Street. The Design Points and contributing areas are further described in Section 2.2.1. and are depicted in the Pre- and Post-Development Watershed Figures in **Appendix C**.

1.2.3 Resource and Critical Areas

Woodard & Curran reviewed Massachusetts Geographic Information System (MassGIS) data, the Massachusetts Department of Environmental Protection's (MassDEP's) Habitat of Potential Regional and Statewide Importance maps, the Massachusetts Stormwater Handbook, the Massachusetts Year 2016 Integrated List of Waters, and the Federal Emergency Management Agency's (FEMA's) National Flood Hazard Layer (NFHL) database. The findings of our review are below:

- The Massachusetts Endangered Species Act (MESA) protects rare species and their habitats by prohibiting the taking of any plant or animal species listed as Endangered, Threatened, or Special Concern by the Massachusetts Division of Fisheries & Wildlife. MESA review is required by the Natural Heritage & Endangered Species Program (NHESP) for projects and activities located within a Priority or Estimated Habitat of Rare Species. Review of the MassGIS Data shows there are no Priority or Estimated Habitats within the Project Area; therefore, the project is not subject to MESA review.
- Per MassGIS Data, there are no Certified or Potential Vernal Pools within or near the project area.
- Per MassGIS Data, the project is not located within any Areas of Critical Environmental Concern.
- Per the MassDEP's Habitat of Potential Regional and Statewide Importance maps for the Towns of Arlington and Lexington, the project in not located within a Habitat of Regional or Statewide Importance.
- Per the Massachusetts Stormwater Handbook, critical areas include Outstanding Resource Waters and Special Resource Waters, recharge areas for public water supplies, bathing beaches, cold-water fisheries, and shellfish growing areas. Review of MassGIS Data indicated that the Arlington Reservoir is not located within a resource area, however, the Swimming Area on the eastern shore of the Reservoir is classified as a bathing beach, as defined in 105 CMR 445, and thus a critical area.
- Per the Massachusetts Year 2016 Integrated List of Waters, Mill Brook, which receives discharges from
 Arlington Reservoir via a sluice gate on the southern portion of the Reservoir, is classified as a Category 5
 water, meaning the waterbody requires a Total Maximum Daily Load (TMDL) restriction. Mill Brook's
 impairment of concern is Escherichia Coli (E. Coli). Proposed site improvements are not likely to increase E.
 Coli levels in Arlington Reservoir, and thus contributing to Mill Brook's impairment.



• Per FEMA's NFHL database, the majority of the Site is located within an area of minimal flood hazard (Zone X). The Reservoir's shoreline and the isolated swimming area are located within special flood hazard areas (Zone AE). The FEMA NFHL FIRMette Map is located in **Appendix A**.

Measures taken to address the presence of a critical area on-Site are detailed in Section 3.6. Critical areas have specific stormwater analysis guidelines, requiring the use of certain pollution prevention measures and BMPs to the maximum extent practicable for redevelopment projects.

1.3 Proposed Project Work

The proposed project consists of paving the approximately 0.5-acre gravel parking area in the southern portion of the site, renovation of the existing bathhouse and concessions building, installation of new ADA-accessible concrete pathways, lifeguard stands, picnic tables, a playground, multi-use court, boat launch, check-in shelter, and several other surficial Site improvements. Construction activities are expected to begin in March 2021 and end in November 2021.



2. STORMWATER EVALUATION

2.1 Stormwater Modeling Methodology

TR-55/TR-20 methodology was used to develop a hydrologic model of the site. Woodard & Curran used the computer program entitled HydroCAD Version 10.0, developed by HydroCAD Software Solutions, LLC in order to create and analyze the site hydrology. The analysis was conducted in order to establish the peak rates of runoff and estimated runoff volume from the project site. This was accomplished to evaluate pre- and post-development conditions during various storm events. Contributing drainage areas were identified and soils, surface cover, watershed slope, and flow paths were evaluated to develop the necessary HydroCAD model input parameters. A minimum Time of Concentration (Tc) of 6 minutes was used in the calculations, as applicable.

Drainage calculations were performed for the pre- and post-development conditions for the 1-, 2-, 10-, 25-, and 100-year 24-hour Type III storm events, and are included in **Appendix D**, in accordance with the Town of Arlington's, Town of Lexington's, and the Massachusetts Department of Environmental Protection's Stormwater Management Regulations. The total rainfall for each of the storm events was based upon data published by the Northeast Regional Climate Center (NRCC) and Natural Resources Conservation Service (NRCS) entitled *Extreme Precipitation in New York and New England* found at http://precip.eas.cornell.edu/. The total precipitation depth for the project site associated with each rainfall event is outlined in **Table 2-1**, below.

Table 2-1: Design Rainfall Data

Type III 24-Hour Storm Event (Frequency)	Rainfall Depth (Inches)
1-Year	2.67
2-Year	3.21
10-Year	4.86
25-Year	6.17
100-Year	8.85

A copy of the NRCC and NRCS Extreme Precipitation Table for the project Site is included in **Appendix A**.

2.2 Hydraulic Model Description

A stormwater model has been developed to compare the peak runoff rates from the pre-development site to the peak runoff rates anticipated from the post-development site. As further described herein, the model demonstrates that the post-development runoff rates will not exceed pre-development rates.

2.2.1 Design Points

Existing and proposed subcatchments were delineated in order to compare pre- and post-development peak rates of runoff. Although the size of each subcatchment differs slightly between the existing and proposed site conditions, the total area analyzed between the two conditions remained the same. A Design Point was established for each watershed, symbolizing the area's ultimate stormwater discharge location. For this analysis, two watershed areas were identified, and therefore two Design Points were chosen, as follows:

• Design Point 1 (DP-1): represents runoff discharging to the Arlington Reservoir and Swimming Area.



 Design Point 2 (DP-2): represents runoff discharging to the ditch located north of the property at 202 Lowell Street.

The locations of the Design Points do not differ in the pre- and post-development analyses, as seen in the figures located in **Appendix C**.

2.2.2 Pre-Development Conditions

The pre-development project area consists of a swimming area, sandy beach, bathhouse, vending machines, concession area, playground, pump station building, walking paths, benches, lifeguard stands, a 0.5-acre gravel parking lot, a small paved parking lot, and various other Site features. Existing grassed areas on-Site were modeled to be in "fair" condition, as much of the grassed surfaces are currently covered in beach sand and therefore are not likely infiltrating groundwater as efficiently as grass in "good" condition would be.

Per Article 15 – Storm Water Mitigation of the Town of Arlington's Title V – Regulations Upon the Use of Private Property Bylaws, impervious surfaces are defined as "a hard-surfaced, human-made area that does not readily absorb or retain water, preventing the infiltration of storm water runoff; including but not limited to...parking and driveway areas..." Upon review of existing conditions at the site, it appears the 0.5-acre gravel parking lot on the southern half of the Site exhibits the hydrologic characteristics one would expect with an impervious surface. Ponded water has been observed on the gravel surface several days after rain events due to its inability to infiltrate to the soil below. Based on this review and Article 15 of the Town of Arlington's Title V Bylaws, the gravel parking area has been considered impervious for the purposes of this stormwater analysis.

The pre-development watershed area is approximately 5.42 acres in size. There are no existing stormwater BMPs on-Site; stormwater runoff from the three subcatchments within the project area is conveyed via overland flow to their respective design points, as described below:

- Subcatchment 1: Subcatchment 1 encompasses the northern portion of the Site, including the playground, beach, and parking lots. Stormwater runoff from subcatchment 1 flows via overland flow from east to west before discharging into the Arlington Reservoir and Swimming Area (DP-1), which is classified by MassDEP as a critical area. The area is approximately 5.22 acres in size; land cover is primarily comprised of grass, beach sand, surface water, and impervious gravel with smaller areas of brush, impervious structures, and sand pathways. The calculated weighted curve number for this subcatchment is 71.
- Subcatchment 2: Subcatchment 2 encompasses the southern-most portion of the 0.5-acre gravel parking area. Stormwater runoff from subcatchment 3 flows via overland flow from north to south before discharging into the ditch just north of the property at 202 Lowell Street (DP-2). The area is approximately 0.20 acre in size; land cover is primarily comprised of impervious gravel, grass, and brush, with smaller areas of impervious surfaces. The calculated weighted curve number for this subcatchment is 64.

The subcatchment areas and their associated design points are illustrated on the Pre-Development Watershed Figure provided in **Appendix C** of this Report.

2.2.3 Post-Development Conditions

The post-development project area will consist of a swimming area, sandy beach, renovated bathhouse, vending machine, and concession area, a newly-paved picnic pavilion and drop-off area, a new check-in area, permeable multi-surface athletic court, playground, lifeguard stands, walking paths, restored grass areas, 21,500 square-foot porous pavement parking lot, and various other Site features. The new walking paths around the project area will be ADA-



accessible and will allow increased Site access not currently provided in the Site's existing condition. The porous pavement parking lot is described in further detail in Section 2.2.4.

Similar to the pre-development model, the post-development watershed area is also 5.42 acres in size. Stormwater runoff from the two subcatchments will flow to its respective design points, as described below:

- Subcatchment 1: Subcatchment 1 will encompass the northern portion of the Site, including the playground, beach, and parking lots. Stormwater runoff from subcatchment 1 will flow via overland flow from east to west before either discharging directly into Arlington Reservoir and Swimming Area (DP-1) or into the porous pavement system proposed for installation over the Site's southern parking area. Stormwater entering the porous pavement system will either infiltrate into the ground or, during large storm events, will be collected by the system's underdrain and discharged towards Arlington Reservoir. The subcatchment area will be approximately 5.32 acres in size; land cover will be primarily comprised of grass, surface water, beach sand, porous asphalt pavement, and various impervious surfaces (including standard asphalt pavement, concrete walkways, and structures), with smaller areas of brush, permeable playground and athletic court surfaces, and stone dust. The calculated weighted curve number for this subcatchment is 69.
- Subcatchment 2: Subcatchment 2 will encompass the area south of the porous pavement parking area. Stormwater runoff from subcatchment 2 will flow via overland flow from north to south before discharging into the ditch just north of the property at 202 Lowell Street (DP-2). The area will be approximately 0.10 acre in size; land cover will be entirely comprised of grass. The calculated weighted curve number for this subcatchment is 39.

The subcatchment areas and their associated design points are illustrated on the Post-Development Watershed Figure provided in **Appendix D** of this Report.

2.2.4 Low Impact Development Technique – Porous Pavement

Porous pavement was selected as a Low Impact Development (LID) technique for this Site in accordance with the Arlington Reservoir Master Plan written by Weston & Sampson in 2018. The proposed 21,500 square-foot porous pavement parking lot will replace the existing impervious gravel lot, which will provide a stabilized parking area and minimize the amount of maintenance required to upkeep the parking lot and reduce the amount sediment transported into Arlington Reservoir during post-construction conditions. Stormwater directed to the porous pavement will filter through the system's asphalt, choker, and pea gravel courses and enter the reservoir course, designed to provide storage capacity while stormwater infiltrates into the soils beneath the system. The bottom of the reservoir course was designed at elevation 161.40, providing a 2-foot separation from the highest seasonal high groundwater table elevation observed during test pitting activities conducted at the Site. A four-inch PVC underdrain and three grate inlets will be installed within the western-most portion of the system's reservoir course to provide an outlet for stormwater during extreme storm events. The invert of these outlets was designed at the 100-year storm elevation within the porous pavement BMP, meaning rainfall greater than the 100-year storm will flow through the reservoir course of the pavement system to the PVC underdrain and grate inlets and will discharge to the Arlington Reservoir (DP-1).

Volume 1, Chapter 1 of the Massachusetts Stormwater Handbook does not list porous pavement as an approved stormwater BMP for discharges near bathing beaches and Volume 2, Chapter 2 of the Handbook states that porous pavement shall be set back at least 100 feet from surface waters to receive any water quality credit. Existing Site constraints, including the lack of available area to install stormwater BMPs and the proximity to surface water across the entire project area, inhibit the use of many typical BMPs. Although porous pavement is not a listed BMP for bathing beaches, its use can be implemented within the project area and it will improve stormwater treatment at the Site by increasing water quality volume, annual recharge, and removal of total suspended solids (TSS) in the post-development Site condition.



2.3 Peak Discharge Rates and Runoff Volumes

The tables below summarize the pre- and post-development peak discharge rates and runoff volumes for each Design Point.

Table 2-2: Pre- and Post-Development Peak Discharge Rates

Design	Design 1-year (cfs)			n 1-year (cfs) 2-year (cfs)			10-	10-year (cfs)			25-year (cfs)			100-year (cfs)		
Point	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	
DP-1	2.96	1.65	-1.31	4.93	3.15	-1.78	12.11	8.92	-3.19	18.53	14.29	-4.24	32.53	26.30	-6.23	
DP-2	0.04	0.00	-0.04	0.10	0.00	-0.10	0.33	0.00	-0.33	0.54	0.02	-0.52	1.04	0.13	-0.91	

Note: Δ stands for net difference between the pre- and post-development rates.

Table 2-3: Pre- and Post-Development Runoff Volumes

Design	Design 1-year (af)			2-year (af)			10	10-year (af)			25-year (af)			100-year (af)		
Point	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	
DP-1	0.25	0.17	-0.08	0.38	0.27	-0.11	0.87	0.66	-0.21	1.32	1.03	-0.29	2.32	1.87	-0.45	
DP-2	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	-0.03	0.04	0.00	-0.04	0.07	0.01	-0.06	

Note: Δ stands for net difference between the pre- and post-development volumes.

Table 2-2 demonstrates a decrease in peak discharge rates between the existing and proposed site conditions for all scenarios shown above; **Table 2-3** demonstrates a decrease in runoff volumes between the existing and proposed site conditions for all scenarios shown above. Complete copies of the pre- and post-development HydroCAD computer model outputs demonstrating that peak discharge rates and runoff volumes decrease between the existing and proposed Site conditions are included in **Appendix D**.



3. COMPLIANCE WITH STORMWATER MANAGEMENT STANDARDS

Volume 1, Chapter 1 of the Massachusetts Stormwater Handbook states:

"For purposes of the Stormwater Management Standards, redevelopment projects are defined to include...maintenance and improvement of existing roadways, including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving."

By this definition, the Arlington Reservoir Phase 2 project is considered a redevelopment project, meaning certain Standards included in the Massachusetts Stormwater Handbook only need to be met to the maximum extent practicable (as defined by Standard 7). The following sections further detail applicability of these Stormwater Management Standards and demonstrates that the proposed Arlington Reservoir – Phase 2 Project complies with these requirements.

3.1 Standard 1: No New Untreated Discharges

"No new stormwater conveyances (e.g. outfalls) will discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth."

In the existing site condition, stormwater is generally transported via overland flow towards the Arlington Reservoir and Swimming Area (DP-1) and the ditch just north of the property at 202 Lowell Street (DP-2). Runoff from the project area is not currently treated prior to discharge. The proposed site improvements will not create any new untreated stormwater discharges and will result in a net decrease in impervious area of approximately 18,000 square feet. Stormwater runoff from Site will be either conveyed via overland flow to Design Points, similar to existing condition drainage patterns, or will be treated by a new porous pavement system prior to infiltrating into the ground or, during extreme storms greater than the 100-year event, discharging into the Arlington Reservoir (DP-1) after filter treatment. There are no proposed untreated stormwater discharges that will cause erosion in or to wetlands or waters of the Commonwealth. This Standard has been met.

3.2 Standard 2: Peak Rate Attenuation

"Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates."

Calculations are provided to show that the post-development peak discharge rates do not exceed pre-development rates for the 1-, 2-, 10-, 25-, and 100-year 24-hour storm events. A detailed description of both the existing and proposed Site conditions are located in Section 2.2 of this report. Copies of the existing and proposed HydroCAD computer model outputs demonstrating that this standard has been met are included in **Appendix D**.

3.3 Standard 3: Recharge

"Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This condition is met when the stormwater management system is designed to infiltrate the required volume as determined in accordance with the Massachusetts Stormwater Handbook."

The proposed improvements will decrease the amount of impervious area across the project Site by approximately 18,000 square feet. No additional groundwater recharge volume is required, however, installation of porous pavement over the existing gravel parking lot in the southern portion of the Site and restoration of grass areas throughout the Site



are proposed as part of this project. The porous pavement and restored grass areas will increase stormwater infiltration, and therefore annual recharge, in the post-development Site condition.

3.4 Standard 4: Water Quality

"Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when: (a) Suitable practices for source control and pollution prevention are identified in long-term pollution prevention plan, and thereafter implemented and maintained; (b) Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and (c) Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook."

Existing Site conditions provide 0% TSS removal. The Town of Arlington is proposing to install a porous pavement system over the existing gravel parking lot in the southern portion of the Site. The system will increase water quality volume and remove TSS from the stormwater runoff produced from the proposed parking lot area and the adjacent grass area to the east sloping downward from Lowell Street in the post-development Site condition. During storm events, stormwater will filter through the porous pavement system's asphalt, choker, and pea gravel courses and enter the reservoir course, designed to provide storage capacity while stormwater infiltrates into the soils beneath the system.

According to Volume 2, Chapter 2 of the Massachusetts Stormwater Handbook, porous pavement systems can remove up to 80% of TSS if the reservoir course is designed to hold the Site's required water quality volume and to drain within 72 hours of a storm event. The proposed Site improvements will decrease the amount of impervious area across the project Site by approximately 18,000 square feet, and therefore no additional water quality volume is required on-Site. However, the porous pavement system's reservoir course has been designed to store the 100-year storm event and to drain within 26 hours of the 100-year event. Therefore, it can be assumed that the proposed porous pavement system will remove up to 80% of the TSS in stormwater runoff discharging to the system. On other parts of the proposed project Site, this Standard is met to the maximum extent practicable by not creating any new untreated stormwater discharges.

An Operations and Maintenance Plan is provided in **Appendix E**, which specifies suitable practices for source control and long-term pollution prevention.

3.5 Standard 5: Land Uses with Higher Potential Pollutant Loads

"For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook."

The proposed project is not considered a Land Use with Higher Potential Pollutant Loads; therefore, this standard does not apply.

3.6 Standard 6: Critical Areas

"Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas as provided in the Massachusetts Stormwater Handbook."



Per the Massachusetts Stormwater Handbook, the Arlington Reservoir and associated Swimming Area on the eastern shore of the Reservoir are classified as critical areas. These surface water features are described throughout this report as DP-1 and will receive stormwater discharges from subcatchment 1 in the post-development Site condition. Critical areas have specific stormwater analysis guidelines, requiring the use of certain pollution prevention measures and BMPs to the maximum extent practicable for redevelopment projects. Compliance with these guidelines is discussed below:

- Standard 6 requires BMP trains discharging to critical areas to remove 80% of TSS prior to discharge. There are no existing stormwater BMPs located in subcatchment 1. In the proposed Site condition, the majority of stormwater runoff from subcatchment 1 will travel, via overland flow, to the Reservoir and Swimming Area by passing over grassed areas and beach sand prior to discharging into DP-1. This stormwater runoff will not be treated by a stormwater BMP, similar to existing Site conditions. Stormwater runoff produced from the proposed porous parking lot area and the adjacent grass area to the east sloping downward from Lowell Street will filter through the porous pavement system, during which 80% of TSS will be removed.
- A water quality depth of one-inch (1") must be used for water quality volume calculations in critical areas. The proposed Site improvements will decrease the amount of impervious area across the project Site by approximately 18,000 square feet, and therefore no additional water quality volume is required on-Site.

The proposed Site improvements meet this Standard to the maximum extent practicable.

3.7 Standard 7: Redevelopment

"A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5 and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions."

The proposed project is considered a redevelopment project and will decrease the overall impervious area on Site by approximately 18,000 square feet. The proposed work fully complies with Stormwater Management Standards 1, 2, 3, 5, 8, 9, and 10, and complies, to the maximum extent practicable, with Standards 4 and 6 as described herein.

3.8 Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

"A plan to control construction related impacts including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented."

A plan to control construction-related impacts, specifically erosion and sedimentation, has been developed and is included in **Appendix F**. The proposed project has been designed to minimize land disturbance and preserve existing vegetation to the maximum extent practicable. The proposed construction BMPs have been designed in accordance with Massachusetts Erosion and Sediment Control BMPs Handbook published by MassDEP.

The Contractor will be responsible for implementing the specified erosion and sedimentation control methods. These measures will be maintained and kept in place until the disturbed areas of the project have fully stabilized. In addition, a U.S. Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Construction General Permit is required whenever construction activities will disturb one or more acres; the proposed project will disturb approximately 5.42 acres.



3.9 Standard 9: Operation and Maintenance Plan

"A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed."

A long-term Operation and Maintenance Plan is included in **Appendix E** of this report.

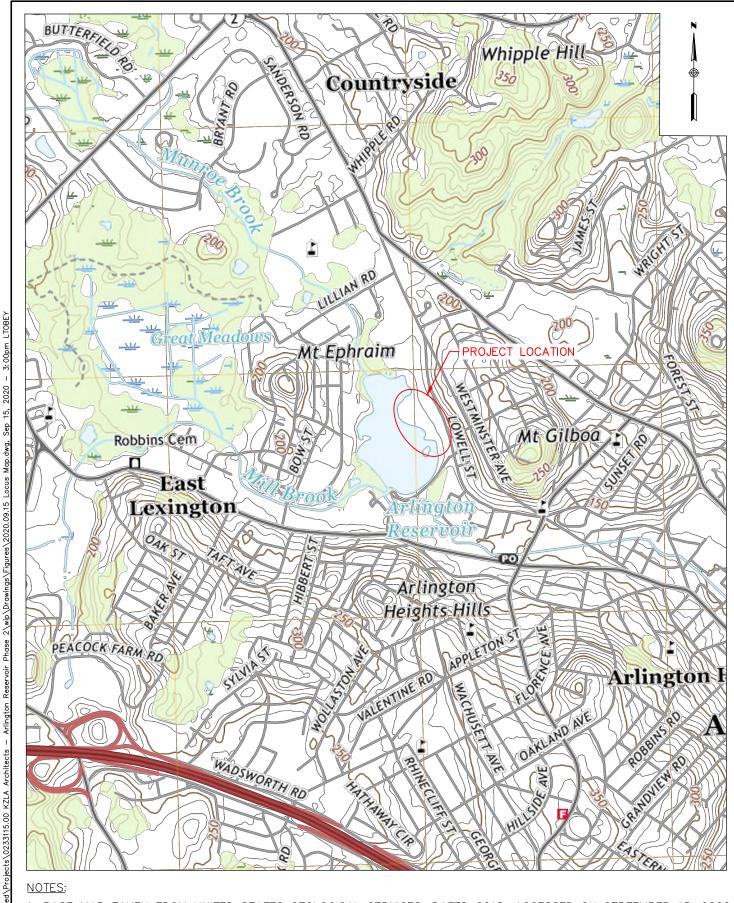
3.10 Standard 10: Prohibition of Illicit Discharges

Standard 10 states that "All illicit discharges to the stormwater management system are prohibited."

The project will not result in any new illicit discharges. An Illicit Discharge Compliance Statement will be submitted prior to construction.



ENVIRONMENTAL RESOURCE DOCUMENTATION APPENDIX A:



NOTES:

1. BASE MAP TAKEN FROM UNITED STATES GEOLOGICAL SERVICES, DATED 2018. ACCESSED ON SEPTEMBER 15, 2020.

40 Shattuck Road, Suite 110 Andover, Massachusetts 01810 866.702.6371 | www.woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS

ARLINGTON RESERVOIR PHASE 2 LOCUS MAP

DESIGNED BY: LLT DRAWN BY: LLT CHECKED BY: BSM 2020.09.15 LOCUS MAP.dw TOWN OF ARLINGTON, MA 51 GROVE STREET ARLINGTON, MA 02476

JOB NO: 0233115.00 DATESEPTEMBER 202

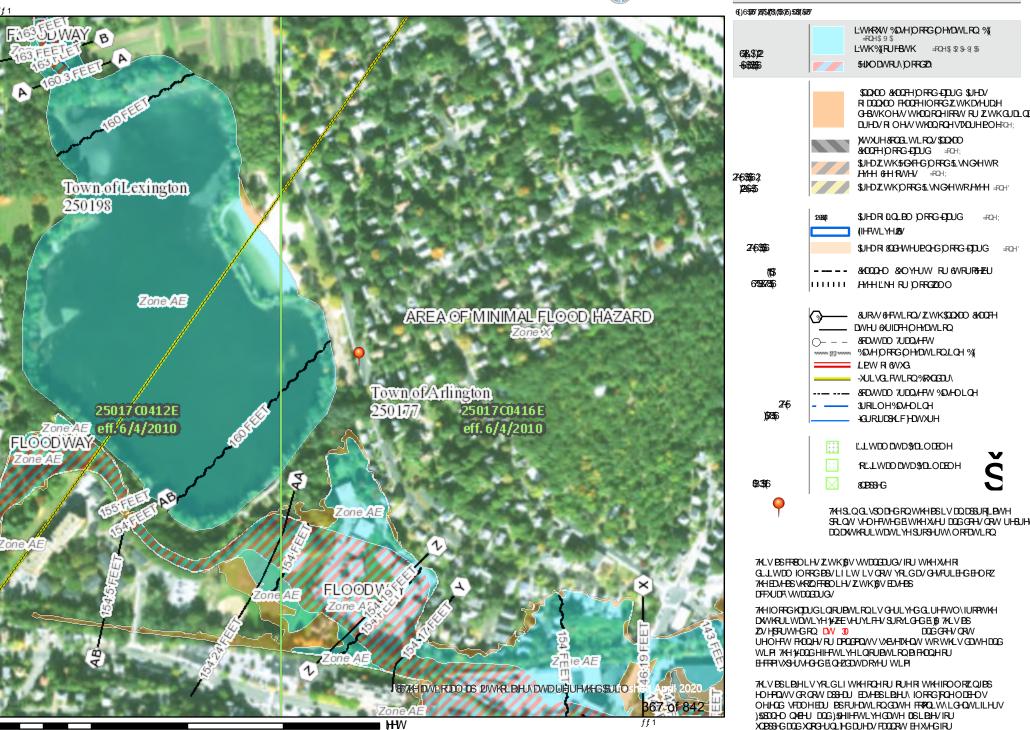
ARLINGTON RESERVOIR 366 of 210 LOWELL ST, ARLINGTON, MA

1DWLRODO (DRRG-EDUGIDHU)51WWH

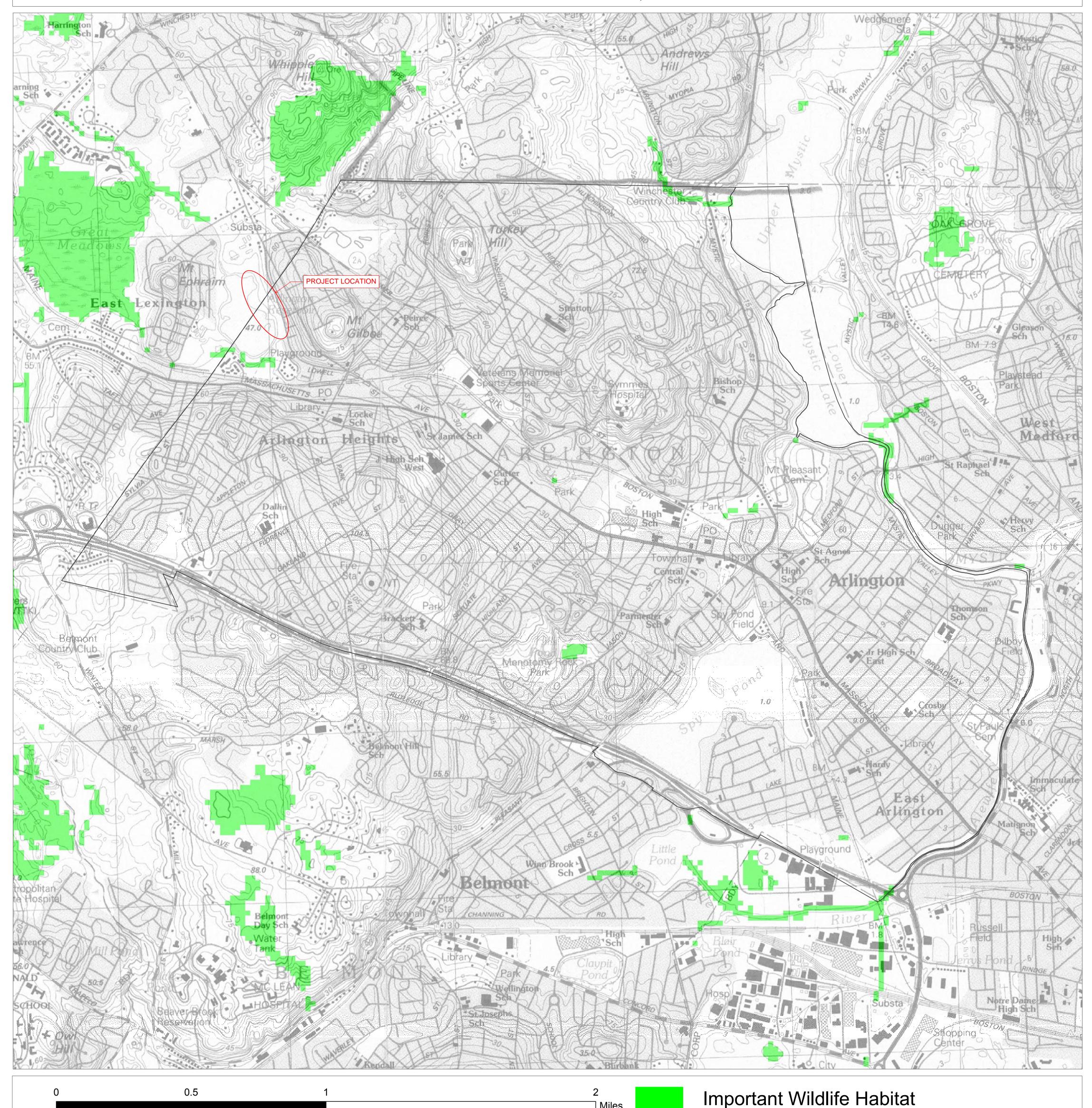


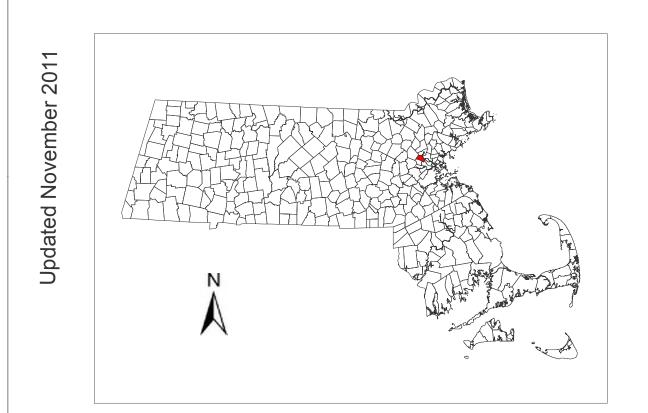
HHOG

UHJYO DWRU\ SYUSRAHY



Habitat of Potential Regional or Statewide Importance Town of ARLINGTON, MA





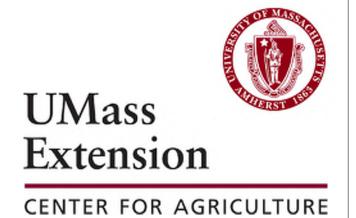
The MassDEPs Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands, June 2006 adopted a new approach for assessing wildlife habitat impacts associated with work in wetlands. This approach utilizes maps developed at the University of Massachusetts Amherst using the Conservation Assessment and Prioritization System (CAPS). The maps depict Habitat of Potential Regional or Statewide Importance that may trigger more intensive levels of review. For more information on how to assess wildlife habitat impacts, see Section III of the Guidance document: http://www.mass.gov/dep/water/laws/wldhab.pdf.

Miles

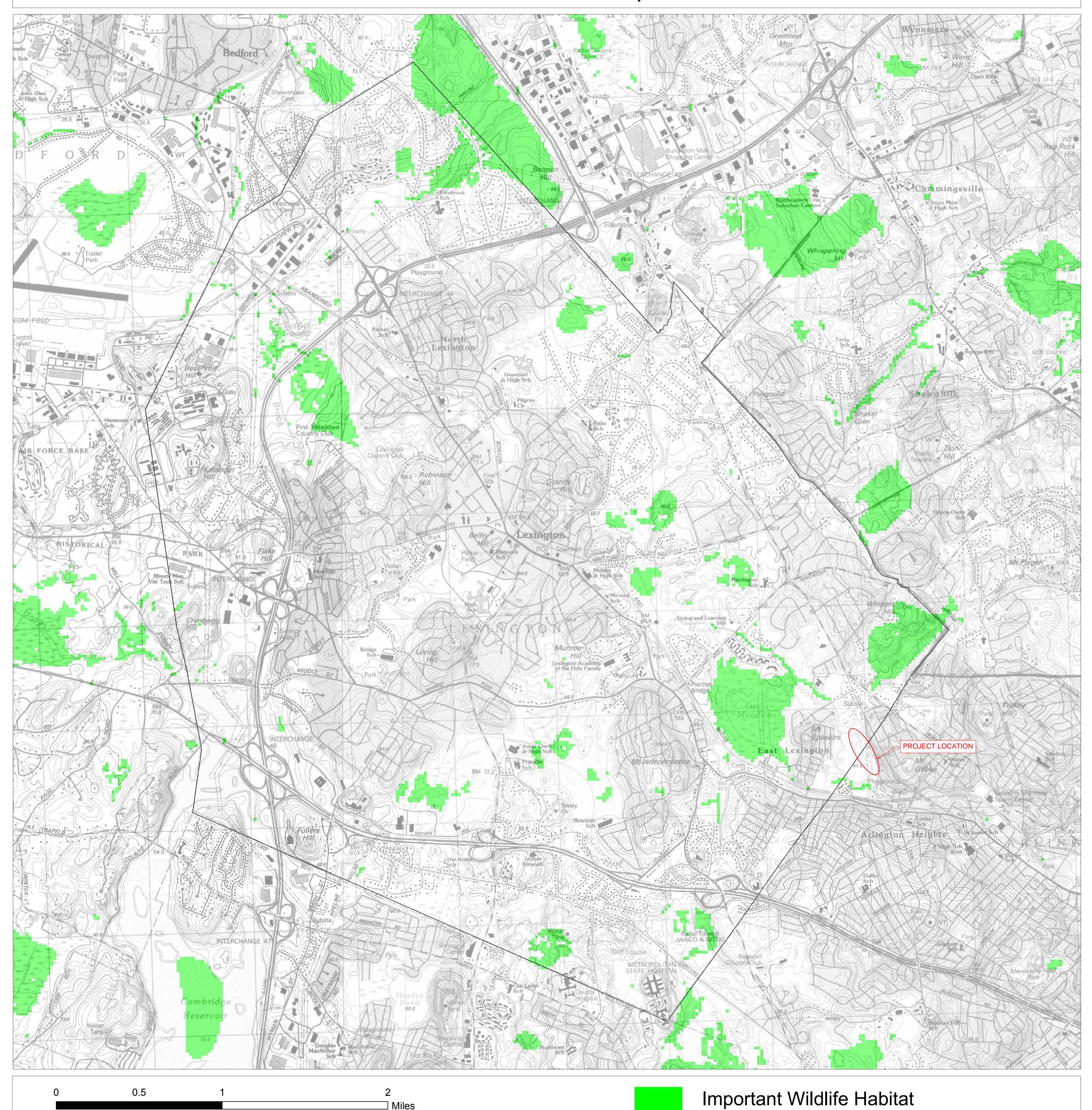
The CAPS model assesses the ecological integrity of Massachusetts landscape features as influenced by environmental stressor metrics (e.g. pollution, fragmentation). CAPS relies on data that are broadly available across Massachusetts. Ecological features which are not consistently surveyed or uniformly available, such as certified vernal pools, rare species, and contamination sites are not included in CAPS. When available, this more specific ecological information may be used in conjunction with the CAPS outputs to better understand particular sites in Massachusetts and support informed conservation decision-making. For more information on the statewide maps produced by the CAPS model, see: http://www.masscaps.org.

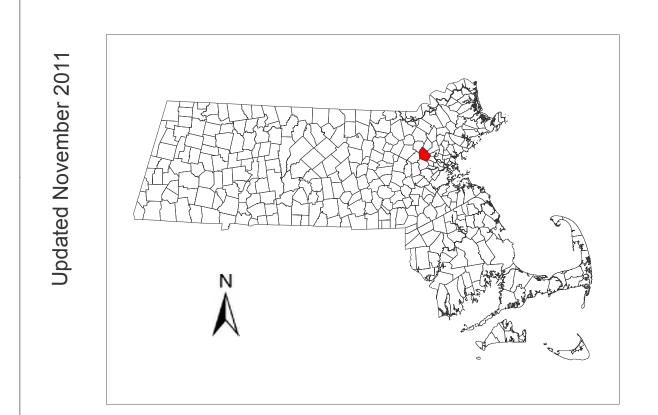
These maps are funded in part by the Massachusetts Executive Office of Energy and Environmental Affairs, the Massachusetts Department of Environmental Protection and the U.S. Environmental Protection Agency under section 104 (b)(3) of the U.S. Clean Water Act. Environmental data sources include the Office of Geographic and Environmental Information (MassGIS). 368 of 842





Habitat of Potential Regional or Statewide Importance Town of LEXINGTON, MA





The MassDEPs Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands, June 2006 adopted a new approach for assessing wildlife habitat impacts associated with work in wetlands. This approach utilizes maps developed at the University of Massachusetts Amherst using the Conservation Assessment and Prioritization System (CAPS). The maps depict Habitat of Potential Regional or Statewide Importance that may trigger more intensive levels of review. For more information on how to assess wildlife habitat impacts, see Section III of the Guidance document: http://www.mass.gov/dep/water/laws/wldhab.pdf.

The CAPS model assesses the ecological integrity of Massachusetts landscape features as influenced by environmental stressor metrics (e.g. pollution, fragmentation). CAPS relies on data that are broadly available across Massachusetts. Ecological features which are not consistently surveyed or uniformly available, such as certified vernal pools, rare species, and contamination sites are not included in CAPS. When available, this more specific ecological information may be used in conjunction with the CAPS outputs to better understand particular sites in Massachusetts and support informed conservation decision-making. For more information on the statewide maps produced by the CAPS model, see: http://www.masscaps.org.

These maps are funded in part by the Massachusetts Executive Office of Energy and Environmental Affairs, the Massachusetts Department of Environmental Protection and the U.S. Environmental Protection Agency under section 104 (b)(3) of the U.S. Clean Water Act. Environmental data sources include the Office of Geographic and Environmental Information (MassGIS).

369 of 842





Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing Yes

State Massachusetts

Location

Longitude 71.187 degrees West 42.428 degrees North

Elevation 0 feet

Date/Time Thu, 10 Sep 2020 11:23:56 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.70	0.87	1.10	1yr	0.75	1.04	1.28	1.63	2.08	2.67	2.90	1yr	2.36	2.79	3.26	3.95	4.62	1yr
2yr	0.35	0.53	0.67	0.88	1.10	1.39	2yr	0.95	1.28	1.61	2.03	2.55	3.21	3.56	2yr	2.84	3.42	3.92	4.66	5.31	2yr
5yr	0.41	0.64	0.81	1.08	1.38	1.76	5yr	1.19	1.60	2.05	2.58	3.24	4.07	4.53	5yr	3.60	4.35	4.97	5.93	6.65	5yr
10yr	0.47	0.73	0.93	1.26	1.64	2.10	10yr	1.41	1.90	2.45	3.10	3.89	4.86	5.43	10yr	4.31	5.22	5.95	7.11	7.88	10yr
25yr	0.56	0.88	1.12	1.55	2.05	2.66	25yr	1.77	2.39	3.11	3.94	4.95	6.17	6.92	25yr	5.46	6.66	7.55	9.05	9.87	25yr
50yr	0.62	1.00	1.29	1.81	2.43	3.19	50yr	2.10	2.84	3.75	4.75	5.95	7.39	8.32	50yr	6.54	8.00	9.04	10.87	11.71	50yr
100yr	0.72	1.17	1.50	2.13	2.89	3.81	100yr	2.50	3.37	4.48	5.69	7.13	8.85	10.00	100yr	7.83	9.62	10.84	13.05	13.90	100yr
200yr	0.82	1.34	1.74	2.49	3.44	4.56	200yr	2.97	4.01	5.38	6.84	8.57	10.61	12.04	200yr	9.39	11.57	12.99	15.68	16.50	200yr
500yr	1.00	1.64	2.13	3.09	4.33	5.78	500yr	3.74	5.05	6.85	8.72	10.91	13.49	15.38	500yr	11.94	14.79	16.51	20.00	20.71	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.46	0.62	0.76	0.84	1yr	0.65	0.82	1.14	1.43	1.76	2.39	2.46	1yr	2.12	2.37	2.89	3.50	4.01	1yr
2yr	0.33	0.51	0.63	0.85	1.05	1.25	2yr	0.90	1.23	1.44	1.90	2.46	3.10	3.43	2yr	2.74	3.30	3.78	4.49	5.14	2yr
5yr	0.39	0.60	0.74	1.02	1.29	1.50	5yr	1.12	1.46	1.72	2.23	2.87	3.73	4.13	5yr	3.30	3.97	4.54	5.42	6.11	5yr
10yr	0.43	0.66	0.82	1.15	1.48	1.71	10yr	1.28	1.67	1.93	2.51	3.22	4.29	4.76	10yr	3.80	4.58	5.22	6.21	6.96	10yr
25yr	0.50	0.76	0.94	1.34	1.77	2.03	25yr	1.53	1.98	2.28	2.95	3.75	5.14	5.73	25yr	4.55	5.51	6.26	7.40	8.25	25yr
50yr	0.55	0.84	1.04	1.50	2.02	2.32	50yr	1.74	2.27	2.57	3.33	4.22	5.89	6.57	50yr	5.21	6.32	7.18	8.42	9.37	50yr
100yr	0.61	0.93	1.16	1.68	2.30	2.64	100yr	1.99	2.58	2.91	3.58	4.74	6.77	7.54	100yr	5.99	7.25	8.24	9.55	10.65	100yr
200yr	0.69	1.04	1.31	1.90	2.65	3.01	200yr	2.29	2.94	3.30	4.00	5.35	7.76	8.65	200yr	6.87	8.32	9.45	10.81	12.08	200yr
500yr	0.80	1.19	1.54	2.23	3.17	3.58	500yr	2.74	3.50	3.88	4.63	6.27	9.30	10.35	500yr	8.23	9.95	11.33	12.69	14.28	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.31	0.48	0.59	0.79	0.97	1.13	1yr	0.84	1.11	1.32	1.76	2.24	2.86	3.14	1yr	2.53	3.02	3.50	4.29	5.02	1yr
2yr	0.36	0.56	0.69	0.93	1.15	1.35	2yr	0.99	1.32	1.56	2.06	2.66	3.34	3.71	2yr	2.96	3.57	4.09	4.86	5.52	2yr
5yr	0.45	0.69	0.86	1.18	1.50	1.78	5yr	1.30	1.74	2.04	2.63	3.35	4.43	4.98	5yr	3.92	4.79	5.42	6.45	7.20	5yr
10yr	0.54	0.84	1.04	1.45	1.87	2.19	10yr	1.62	2.14	2.54	3.19	4.02	5.51	6.24	10yr	4.88	6.00	6.73	8.03	8.82	10yr
25yr	0.71	1.07	1.34	1.91	2.51	2.88	25yr	2.17	2.82	3.36	4.11	5.11	7.32	8.42	25yr	6.48	8.09	8.97	10.76	11.55	25yr
50yr	0.85	1.30	1.62	2.33	3.13	3.56	50yr	2.70	3.48	4.16	4.99	6.13	9.11	10.57	50yr	8.06	10.16	11.13	13.44	14.18	50yr
100yr	1.04	1.58	1.98	2.85	3.92	4.39	100yr	3.38	4.29	5.16	6.33	7.35	11.32	13.28	100yr	10.02	12.77	13.82	16.82	17.43	100yr
200yr	1.27	1.91	2.42	3.51	4.89	5.41	200yr	4.22	5.29	6.41	7.73	8.81	14.10	16.70	200yr	12.48	16.06	17.18	21.05	21.44	200yr
500yr	1.65	2.46	3.17	4.60	6.54	7.13	500yr	5.64	6.97	8.53	10.08	11.21	18.85	22.64	500yr	16.68	21.77	22.89	28.39	28.21	500yr





SOILS MAP AND TEST PIT LOGS APPENDIX B:



MAP LEGEND MAP INFORMATION The soil surveys that comprise your AOI were mapped at Area of Interest (AOI) 1:25,000. Area of Interest (AOI) C/D Soils Warning: Soil Map may not be valid at this scale. D Soil Rating Polygons Enlargement of maps beyond the scale of mapping can cause Not rated or not available Α misunderstanding of the detail of mapping and accuracy of soil Water Features line placement. The maps do not show the small areas of A/D contrasting soils that could have been shown at a more detailed Streams and Canals В scale. Transportation B/D Rails Please rely on the bar scale on each map sheet for map С Interstate Highways C/D Source of Map: Natural Resources Conservation Service **US Routes** Web Soil Survey URL: D Major Roads Coordinate System: Web Mercator (EPSG:3857) Not rated or not available Local Roads Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Soil Rating Lines Background Aerial Photography Albers equal-area conic projection, should be used if more A/D accurate calculations of distance or area are required. This product is generated from the USDA-NRCS certified data as of the version date(s) listed below. B/D Soil Survey Area: Middlesex County, Massachusetts Survey Area Data: Version 20, Jun 9, 2020 C/D Soil map units are labeled (as space allows) for map scales 1:50,000 or larger. Not rated or not available Date(s) aerial images were photographed: Sep 11, 2019—Oct 5, Soil Rating Points The orthophoto or other base map on which the soil lines were Α compiled and digitized probably differs from the background A/D imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident. В B/D

Web Soil Survey National Cooperative Soil Survey

Hydrologic Soil Group

		_		
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Water		7.3	47.2%
253B	Hinckley loamy sand, 3 to 8 percent slopes	А	7.2	46.4%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	0.8	5.4%
631C	Charlton-Urban land- Hollis complex, 3 to 15 percent slopes, rocky	А	0.2	1.1%
Totals for Area of Inter	est	1	15.5	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

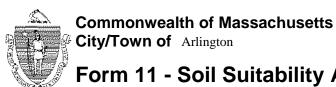
Tie-break Rule: Higher



Commonwealth of Massachusetts City/Town of Arlington

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A.	A. Facility Information				
	Town of Arlington Owner Name				
	210 Lowell Street				
	Street Address		Map/Lot #		
	Arlington MA	A	02474		
	City Stat		Zip Code		
В.	B. Site Information				
1.	. (Check one)	de 🗌 Repair Test	pits for drainage purp	ooses	
2.	. Soil Survey Available? X Yes No I	f yes:		Web Soil Survey Source	253B Soil Map Unit
	Hinckley Loamy Sand				
		Soil Limitations			
	Sandy and gravelly glaciofluvial deposits				
		_andform			
3.	. Surficial Geological Report Available? X Yes No	If yes: MassGIS Oliv	er		
		Year Published/S	Source	Map Unit	
	Sand and gravel / till and bedrock				
	Description of Geologic Map Unit:				
4.	. Flood Rate Insurance Map Within a regulatory flo	oodway? 🗌 Yes 🗓 No			
5.	. Within a velocity zone? Yes X No				
6.	. Within a Mapped Wetland Area? Yes No	If yes, Masso	GIS Wetland Data L	ayer: Wetland T	уре
7.	\	/06/20 hth/Day/ Year	Range: Above	e Normal 🗵 Norn	nal
8.	. Other references reviewed:				



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

4												
C. On-	Site Revi	ew (minim	num of two hole	es requ	ired at ever	у ргоро	sed prir	mary and r	eserve disp	osal area))	
Deep	Observation	n Hole Numb	er: <u>TP-1</u>	08/06. Date	/20	7:30	AM	70*, su	ınny			
	Parki	ing lot	Hole #	Date	None	Time		Weather Many large		Latitude		Longitude: 0-2
1. Land	Use (e.g., we	oodland, agricultu	ural field, vacant lot, e	etc.)	Vegetation				es (e.g., cobbles,	stones, boulder	rs, etc.)	Slope (%)
De	scription of Lo	ocation: S	See attached sketch									
	Parent Materia											
2. SUII F	areni Materia	<u> </u>			Lai	ndform		Posi	tion on Landscap	e (SU, SH, BS,	FS, TS)	
3. Dista	nces from:	Oper	n Water Body	>25 fe	et	D	rainage V		feet			_>25_ feet
			Property Line _				_	-			Other	feet
4 Unsuit:	able Material		Yes 🗵 No									
4. Onout	abic Material	0 1 1000Ht	100 [24] 110	11 100.			i ili iviatorit		vvcatilicica/i ia	otarca recor		arook
5. Grou	ndwater Obse	erved: 🗵 Yes	s □ No		If yes	s: <u>68"</u>	Depth We	eping from Pit	_	Depth S	Standing V	Vater in Hole
						Soil Log	J					
	Cail Harinan	Cail Taytura	Sail Matrice Calar	Red	oximorphic Fea	tures		Fragments		Soil		
Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color- Moist (Munsell)	Depth	Color	Percent	% by	Cobbles & Stones	Soil Structure	Consistence (Moist)		Other
0-27	Fill											
0-27	1 111											
27-38	A	Sandy Loam	10YR3/2						Massive	Friable		
		Sundy Zoum								1114610		
38-44	В	Sandy Loam	10YR3/4						Massive	Friable		
					High and	. 2	2			F : 11		
44-84	С	Sandy Loam	10YR5/2	44"	Low Chroma	>2	2	10	Massive	Friable		
Addit	ional Notes:											



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep	Observation	n Hole Numb	er: <u>TP-2</u> Hole #	08/06	/20	7:45	AM	70*, su	ınny			
	Parki	ng lot	Hole #	Date	None	Time		Weather		Latitude		Longitude: 0-2
. Land De			ural field, vacant lot, e See attached sketch		Vegetation			Surface Stone	es (e.g., cobbles,	stones, boulde	rs, etc.)	Slope (%)
	arent Materia					ndform		Posi	tion on Landscap	pe (SU. SH. BS.	. FS. TS)	
. Dista	nces from:	-	n Water Body _ Property Line _		et	D	_	/ay <u>N/A</u>	feet	We	etlands	>25 feet
		s Present: erved: Yes	Yes 🗓 No	If Yes: [Weathered/Fra _			
				Red	oximorphic Fea	Soil Log	Coarse I	Fragments		Soil		
							0/ hv	Valuma		3011		
Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color- Moist (Munsell)	Depth	Color	Percent	% by Gravel	Volume Cobbles & Stones	Soil Structure			Other
Depth (in) 0-16								Cobbles &	Soil Structure	Consistence		Other
	/Layer							Cobbles &	Soil Structure Massive	Consistence		Other
0-16	/Layer Fill	(USDA	Moist (Munsell) 10YR3/2					Cobbles &		Consistence (Moist)		Other
0-16 16-30	/Layer Fill A	Sandy Loam	Moist (Munsell) 10YR3/2 10YR6/6	Depth	Color High and	Percent		Cobbles &	Massive	Consistence (Moist) Friable		Other
0-16 16-30 30-43	/Layer Fill A B	Sandy Loam Sandy Loam	Moist (Munsell) 10YR3/2 10YR6/6	Depth	Color High and	Percent	Gravel	Cobbles & Stones	Massive Massive	Consistence (Moist) Friable Friable		Other
0-16 16-30 30-43	/Layer Fill A B	Sandy Loam Sandy Loam	Moist (Munsell) 10YR3/2 10YR6/6	Depth	Color High and	Percent	Gravel	Cobbles & Stones	Massive Massive	Consistence (Moist) Friable Friable		Other

Additional Notes:



Commonwealth of Massachusetts City/Town of Arlington

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

9-25 B Sandy Loam 10YR6/6													
Land Use Parking lot (e.g., wooldand, agricultural field, vacant lot, etc.) Description of Location: See attached sketch Soil Parent Material:	C. On-	Site Revi	iew (minim	num of two hole	es requ	iired at ever	y propo	sed prir	mary and r	eserve disp	oosal area))	
Land Use Parking lot Ge.g., woordand, agricultural field, vacant lot, etc.) Vegetation Vegetation Surface Stones (e.g., cobbles, stones, boulders, etc.) Slope (%)	Deep	Observation	n Hole Numb	er: TP-3	08/06	/20	8:00 2	AM	70*, su	ınnv			
Description of Location: See attached sketch Soil Parent Material: Till	•			Hole #	Date		Time		Weather	•	Latitude		
Distances from:	1. Land			ural field, vacant lot, e	etc.)						stones, boulder	rs, etc.)	
Distances from:	Des	scription of Lo	ocation: _S	See attached sketch	l								
Distances from: Open Water Body Property Line Line Line Line Line Line Line Line													
Distances from: Open Water Body Property Line Property Lin	2. SUII F	areni watena	al			Lar	ndform		Posi	tion on Landscar	pe (SU, SH, BS,	, FS, TS)	
Property Line	3. Distai	nces from:	Oper	n Water Body	>25 fe	et	D	rainage V					
Unsuitable Materials Present:			-	-				•	· —				
Groundwater Observed: Yes No If yes: Depth Weeping from Pit Depth Standing Water in Hole Soil Horizon Pepth (in) Soil Horizon Pith (USDA Percent Pepth (in) Pepth (In) Percent	4. Unsuita	able Material						-	· · · · · · · · · · · · · · · · · · ·				
Soil Horizon / Layer Soil Texture (USDA Soil Matrix: Color Moist (Munsell) Depth Color Percent Gravel Cobbles & Stones Soil Structure Soil Structure Consistence (Moist) Other 9-25 B Sandy Loam 10YR6/6 High and Low Chroma Soil Low Chroma Soil Structure Cobbles & Stones Soil Structure Consistence (Moist) 9-25 C Sandy Loam 10YR5/3 32" High and Low Chroma Soil Structure Cobbles & Stones Soil Structure Consistence (Moist) 9-25 B Sandy Loam 10YR5/3 32" High and Low Chroma Soil Structure Cobbles & Stones Soil Structure Consistence (Moist) 9-25 Sandy Loam 10YR5/3 32" High and Low Chroma Soil Structure Consistence (Moist) 9-26 Sandy Loam 10YR5/3 32" High and Low Chroma Soil Structure Cobbles & Stones Soil Structure Consistence (Moist) 9-27 Depth Color Percent Gravel Cobbles & Stones Soil Structure Consistence (Moist) 9-28 Depth Color Percent Cobbles & Stones Soil Structure Cobbles & Soil Structure Cobbles & Soil Structure Consistence (Moist) 9-29 Depth Color Percent Cobbles & Stones Soil Structure Cobbles & Soil Structure Cobbles					-								
Pepth (in) Soil Horizon /Layer (USDA Soil Texture (USDA Soil Matrix: Color-Moist (Munsell) Depth Color Percent Gravel Cobbles & Stones	5. Groui	ndwater Obse	erved: Yes	S X No		If yes	i:	Depth We	eping from Pit	_	Depth S	Standing V	/ater in Hole
Soil Horizon (USDA Soil Matrix: Color Moist (Munsell) Depth Color Percent Gravel Cobbles & Stones Soil Structure Consistence (Moist) Depth Color Percent Gravel Stones Soil Structure Consistence (Moist) Depth Color Percent Gravel Stones Soil Structure Consistence (Moist) Massive Friable Soil Structure Consistence (Moist) Depth Color Percent Gravel Stones Soil Structure Consistence (Moist) Massive Friable							Soil Log	J					
Color Percent Gravel Cobbles & Stones Solidative Color C		Soil Horizon	Soil Texture	Soil Matrix: Color-	Red	loximorphic Fea	tures						
9-25 B Sandy Loam 10YR6/6	Depth (in)				Depth	Color	Percent	_	Cobbles &	Soil Structure			Other
25-55 C Sandy Loam 10YR5/3 32" High and Low Chroma >2 2 10 Massive Friable	0-9	Fill											
25-55 C Sandy Loam 10YR5/3 32" High and Low Chroma >2 2 10 Massive Friable	9-25	В	Sandy Loam	10YR6/6						Massiva	F.3.1.1.		
25-55 C Sandy Loam 10YR5/3 32" Low Chroma >2 2 10 Massive Friable						High and				Iviassive	Friable		
	25-55	C	Sandy Loam	10YR5/3	32"	_	>2	2	10	Massive	Friable		
					1								
Additional Notes:	Additi	ional Notes											



Commonwealth of Massachusetts City/Town of Arlington

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep	Observation	n Hole Numb	er: <u>TP-4</u>	08/06	/20	8:30 /	AM	70*, su	ınny			
_			Hole #	Date	None	Time		Weather		Latitude	<u></u>	Longitude:
1. Land	Use Parki	ing 101 oodland, agriculti	ural field, vacant lot, e	tc.)	None Vegetation			Many large Surface Stone	es (e.g., cobbles,	stones, boulder	rs. etc.)	0-2 Slope (%)
De		_	See attached sketch		3				, , , , , , , , , , , , , , , , , , , ,		, ,	1 - ()
2. Soil F	Parent Materia	al: Till				ndform		Posi	tion on Landscap	a (SII SH BS	ES TS)	
P Dieto	ncoc from:	Onor	n Water Body	>25 60			rainaga M		feet			>25 feet
o. Dista	nces nom.		· -									
1 Lloquite	abla Matarial		Property Line _				_	· · · · · · · · · · · · · · · · · · ·			Other	feet
r. Urisult	able Material	s Present	Yes 🗓 No	ir Yes:	☐ Disturbed S	oli 🗀	riii Materiai	I 📙	vveatnered/Fra	ctured Rock	⊔ ве	arock
5. Grou	ndwater Obse	erved: Yes	X No		If yes	:	Depth Wee	ping from Pit		Depth S	Standing V	Vater in Hole
						Soil Log			_	·	,	
				Red	oximorphic Feat	tures		Fragments		Soil		
Depth (in)	Soil Horizon	Soil Texture	Soil Matrix: Color- Moist (Munsell)				% by	Volume	Soil Structure	Consistence		Other
Doptii (iii)	/Layer	(USDA	woist (wuriseii)	Depth	Color	Percent	Gravel	Cobbles &				
	/Layer	(USDA	Moist (Muriseri)	Depth	Color	Percent	Gravel	Cobbles & Stones		(Moist)		
0-12	/Layer Fill	(USDA	worst (wursen)	Depth	Color	Percent	Gravel					
0-12	Fill		, ,	Depth	High and	Percent >2	Gravel 2	Stones		(Moist)		
		Sandy Loam	, ,	•					Massive			
0-12	Fill		, ,	•	High and			Stones		(Moist)		
0-12	Fill		, ,	•	High and			Stones		(Moist)		
0-12	Fill		, ,	•	High and			Stones		(Moist)		
0-12	Fill		, ,	•	High and			Stones		(Moist)		
0-12	Fill		, ,	•	High and			Stones		(Moist)		
0-12	Fill		, ,	•	High and			Stones		(Moist)		
0-12	Fill		, ,	•	High and			Stones		(Moist)		



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

W~-UMI	08/06/20	
Signature of Soil Evaluator	Date	
William Hall, P.E., S.E. 13592	06/31/21	
Typed or Printed Name of Soil Evaluator / License #	Expiration Date of License	
Leyna Tobey - Woodard & Curran	N/A	
Name of Approving Authority Witness	Approving Authority	

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with <u>Percolation Test Form 12</u>.

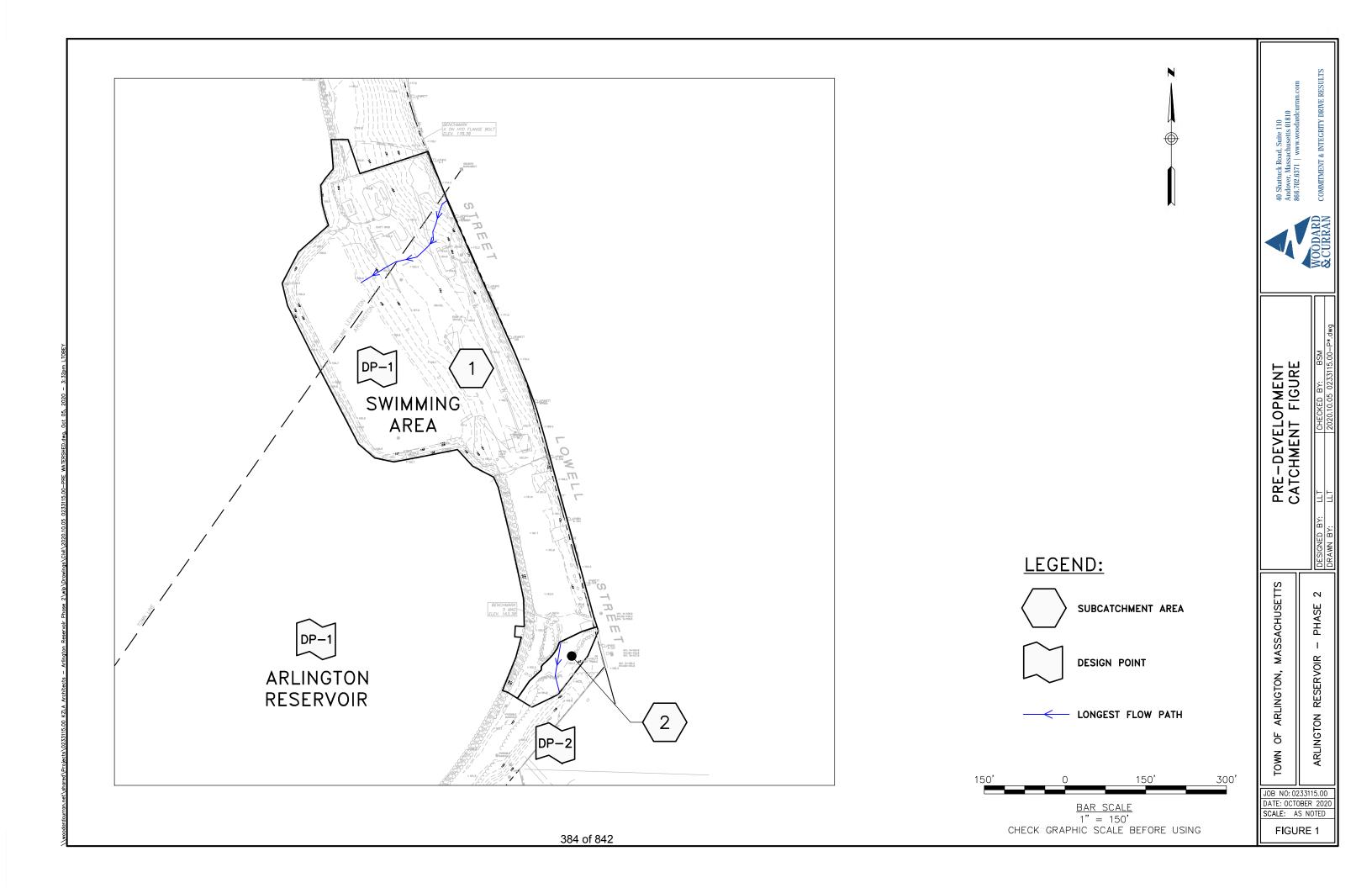
Field Diagrams: Use this area for field diagrams:

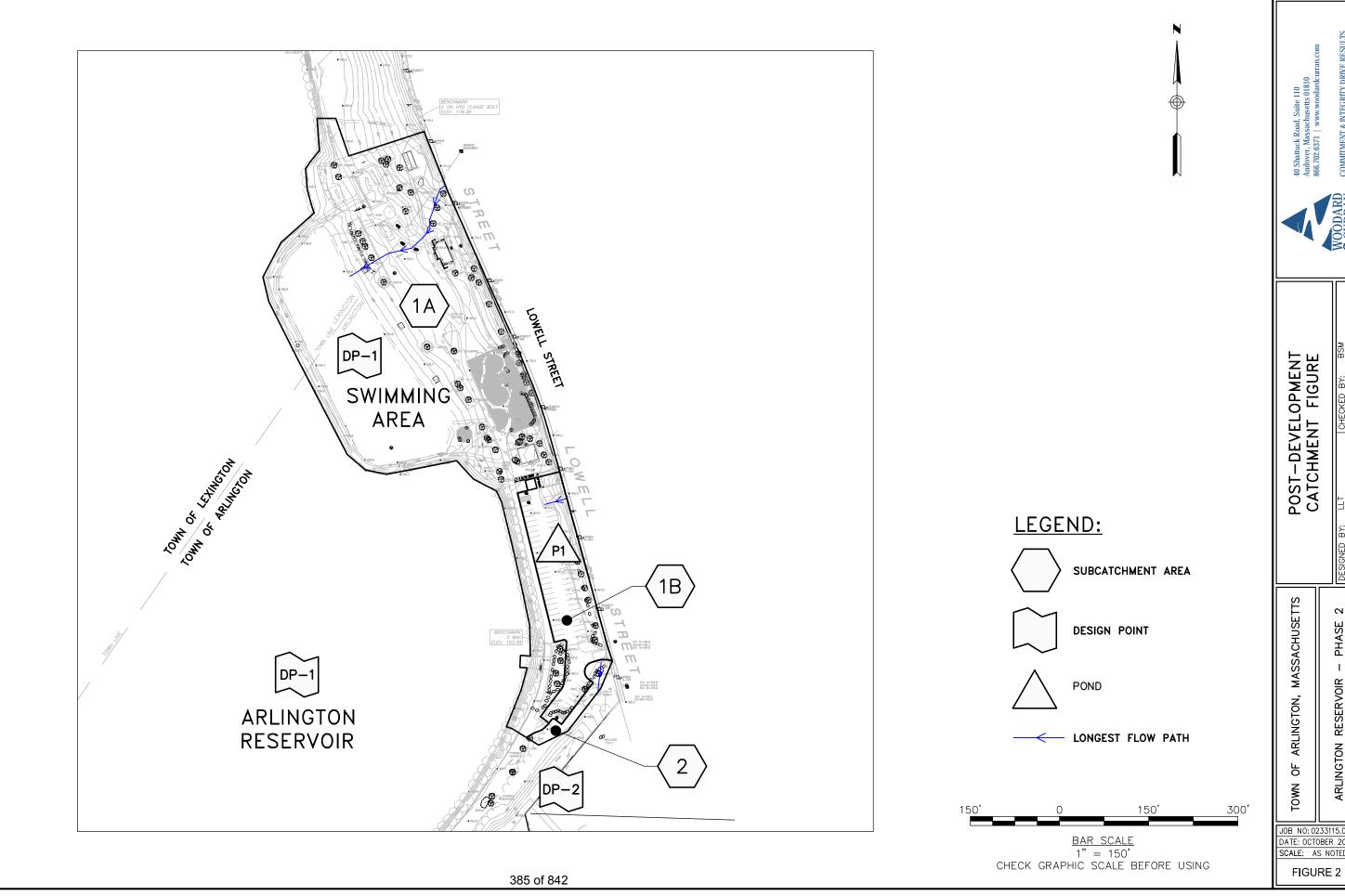
See attached sketch





APPENDIX C: **STORMWATER FIGURES**





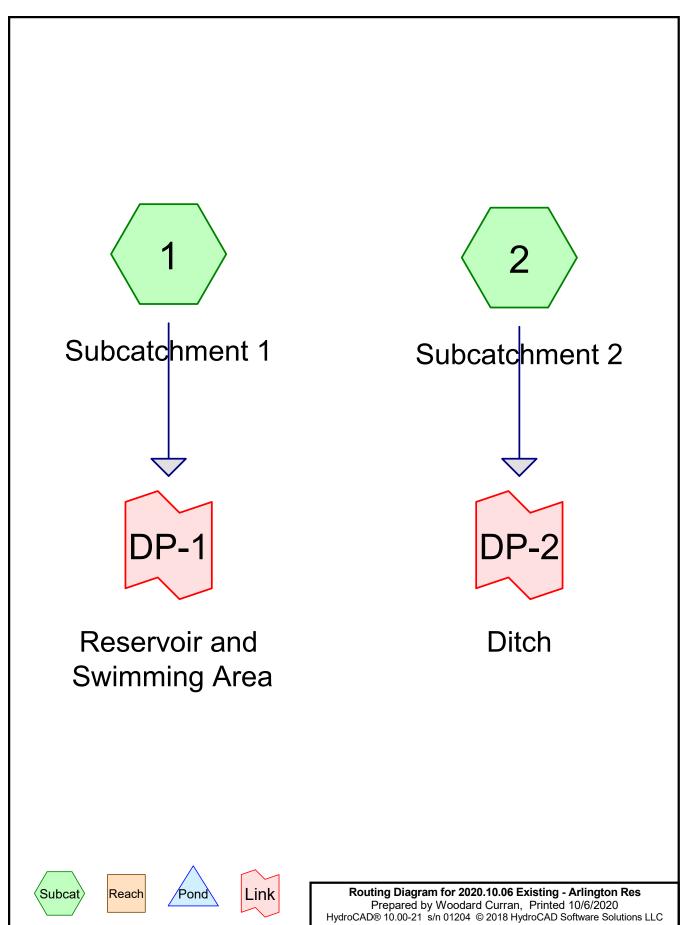
PHASE

ARLINGTON RESERVOIR

JOB NO: 0233115.00 DATE: OCTOBER 2020 SCALE: AS NOTED



APPENDIX D: **HYDROCAD STORMWATER MODEL REPORTS**



Printed 10/6/2020 Page 2

Area Listing (all nodes)

Area	a CN	Description
(acres)	(subcatchment-numbers)
1.53	1 49	50-75% Grass cover, Fair, HSG A (1, 2)
1.31	7 63	Beach Sand, HSG A (1)
0.379	9 30	Brush, Good, HSG A (1, 2)
0.04	96	Dense Sand Path, HSG A (1)
0.64	6 98	Gravel parking, HSG A (1, 2)
0.23	4 98	Impervious Surface, HSG A (1, 2)
0.05	5 39	Open Space, Good, HSG A (>75% Grass Cover) (1)
1.20	7 98	Water Surface, HSG A (1)
5.41	6 70	TOTAL AREA

2020.10.06 Existing - Arlington Res
Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020 Page 3

Soil Listing (all nodes)

Area	Soil	Subcatchment
(acres)	Group	Numbers
5.416	HSG A	1, 2
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
5.416		TOTAL AREA

2020.10.06 Existing - Arlington Res
Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020 Page 4

Ground Covers (all nodes)

HSG-A	HSG-B (acres)	HSG-C	HSG-D	Other	Total	Ground Cover	Subcatchment Numbers
 (acres)	(acres)	(acres)	(acres)	(acres)	(acres)	Cover	
1.531	0.000	0.000	0.000	0.000	1.531	50-75% Grass cover, Fair	1, 2
1.317	0.000	0.000	0.000	0.000	1.317	Beach Sand	1
0.379	0.000	0.000	0.000	0.000	0.379	Brush, Good	1, 2
0.046	0.000	0.000	0.000	0.000	0.046	Dense Sand Path	1
0.646	0.000	0.000	0.000	0.000	0.646	Gravel parking	1, 2
0.234	0.000	0.000	0.000	0.000	0.234	Impervious Surface	1, 2
0.055	0.000	0.000	0.000	0.000	0.055	Open Space, Good	1
1.207	0.000	0.000	0.000	0.000	1.207	Water Surface	1
5.416	0.000	0.000	0.000	0.000	5.416	TOTAL AREA	

2020.10.06 Existing - Arlington Res

Type III 24-hr 1-Year Rainfall=2.67"

Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020 Page 5

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=0.58"

Tc=6.0 min CN=71 Runoff=2.96 cfs 0.251 af

Subcatchment 2: Subcatchment 2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=0.33"

Tc=6.0 min CN=64 Runoff=0.04 cfs 0.006 af

Link DP-1: Reservoir and Swimming Area Inflow=2.96 cfs 0.251 af

Primary=2.96 cfs 0.251 af

Link DP-2: Ditch Inflow=0.04 cfs 0.006 af

Primary=0.04 cfs 0.006 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.257 af Average Runoff Depth = 0.57" 61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020

Page 6

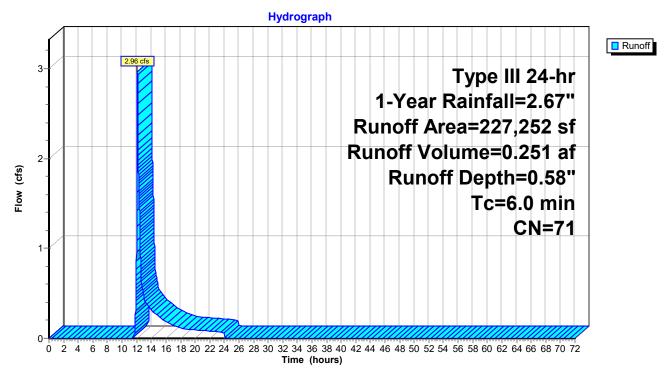
Summary for Subcatchment 1: Subcatchment 1

Runoff 2.96 cfs @ 12.10 hrs, Volume= 0.251 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 1-Year Rainfall=2.67"

	Α	rea (sf)	CN	Description					
		14,435	30	Brush, Goo					
*		57,370	63	Beach Sand					
*		1,998	96	Dense Sand	d Path, HS	G A			
		63,530	49	50-75% Grass cover, Fair, HSG A					
*	24,927 98 Grav			Gravel park	ravel parking, HSG A				
*		9,994 98 Impervious Surface, HSG A							
		52,585	98	98 Water Surface, HSG A					
*	2,413 39 Open Space, Good, HSG A (>75% Grass Cover)					SG A (>75% Grass Cover)			
	2	27,252	71	Weighted Average					
	139,746			61.49% Per	vious Area	1			
	87,506			38.51% Impervious Area					
	,								
	Tc	Length	Slop	e Velocity	Capacity	Description			
	(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)				
6.0 Direct Entry,						Direct Entry,			

Subcatchment 1: Subcatchment 1



HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 7

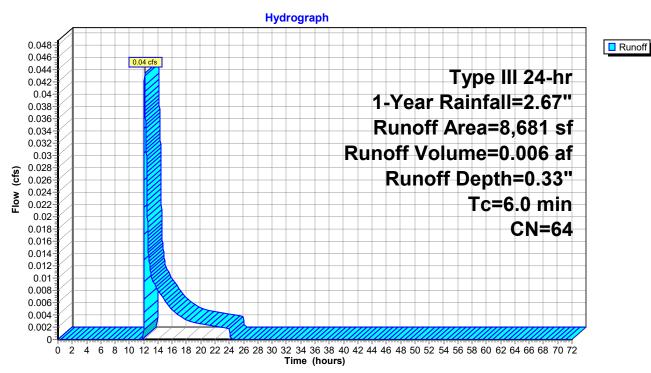
Summary for Subcatchment 2: Subcatchment 2

Runoff = 0.04 cfs @ 12.13 hrs, Volume= 0.006 af, Depth= 0.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 1-Year Rainfall=2.67"

	Aı	rea (sf)	CN	Description						
		2,076	30	Brush, Good, HSG A						
		3,179	49	50-75% Grass cover, Fair, HSG A						
*		3,211	98	Gravel parking, HSG A						
		215	15 98 Impervious Surface, HSG A							
		8,681	64 Weighted Average							
		5,255		60.53% Pervious Area						
		3,426		39.47% Imp	pervious Ar	rea				
	Tc	Length	Slope	Velocity	Capacity	Description				
(r	min)	(feet)	(ft/ft	(ft/sec)	(cfs)					
	6.0					Direct Entry,				

Subcatchment 2: Subcatchment 2



HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 8

Summary for Link DP-1: Reservoir and Swimming Area

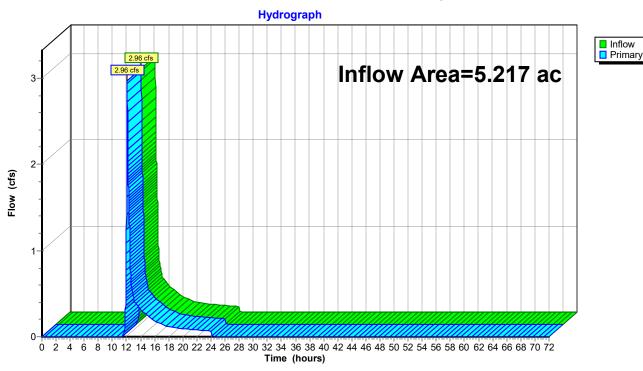
Inflow Area = 5.217 ac, 38.51% Impervious, Inflow Depth = 0.58" for 1-Year event

Inflow = 2.96 cfs @ 12.10 hrs, Volume= 0.251 af

Primary = 2.96 cfs @ 12.10 hrs, Volume= 0.251 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area



Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 9

Summary for Link DP-2: Ditch

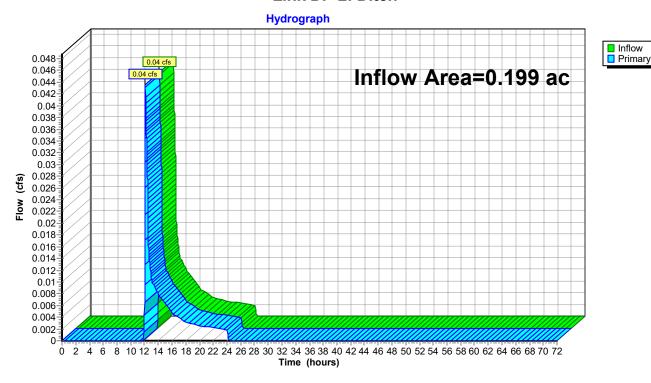
Inflow Area = 0.199 ac, 39.47% Impervious, Inflow Depth = 0.33" for 1-Year event

Inflow = 0.04 cfs @ 12.13 hrs, Volume= 0.006 af

Primary = 0.04 cfs @ 12.13 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



2020.10.06 Existing - Arlington Res

Type III 24-hr 2-Year Rainfall=3.21"

Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020

<u>Page 10</u>

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=0.88"

Tc=6.0 min CN=71 Runoff=4.93 cfs 0.384 af

Subcatchment 2: Subcatchment 2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=0.56"

Tc=6.0 min CN=64 Runoff=0.10 cfs 0.009 af

Link DP-1: Reservoir and Swimming Area Inflow=4.93 cfs 0.384 af

Primary=4.93 cfs 0.384 af

Link DP-2: Ditch Inflow=0.10 cfs 0.009 af

Primary=0.10 cfs 0.009 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.394 af Average Runoff Depth = 0.87" 61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Printed 10/6/2020 Page 11

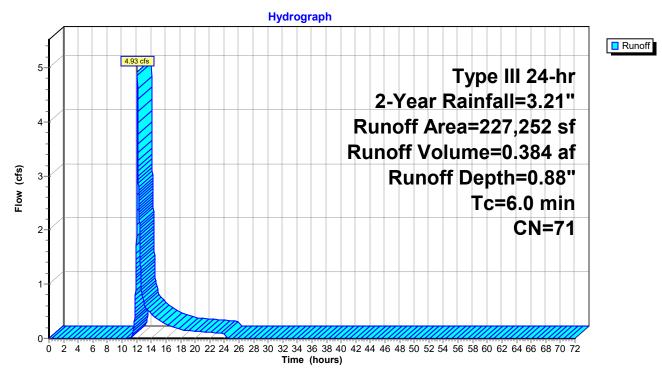
Summary for Subcatchment 1: Subcatchment 1

Runoff = 4.93 cfs @ 12.10 hrs, Volume= 0.384 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.21"

	Α	rea (sf)	CN	Description							
		14,435	30	Brush, Good, HSG A							
*		57,370	63	Beach Sand	d, HSG A						
*		1,998	96	Dense Sand	d Path, HS	G A					
		63,530	49	50-75% Gra	50-75% Grass cover, Fair, HSG A						
*		24,927	98	Gravel park	ing, HSG A	A					
*		9,994	98	Impervious	Surface, H	ISG A					
		52,585	98	Water Surfa	Vater Surface, HSG A						
*		2,413	39	Open Space, Good, HSG A (>75% Grass Cover)							
	2	27,252	71	Weighted A	verage						
	1	39,746		61.49% Pervious Area							
		87,506		38.51% Imp	ervious Ar	ea					
	Tc	Length	Slop	e Velocity	Capacity	Description					
	(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)						
<u></u>	6.0		•			Direct Entry,					

Subcatchment 1: Subcatchment 1



Printed 10/6/2020 Page 12

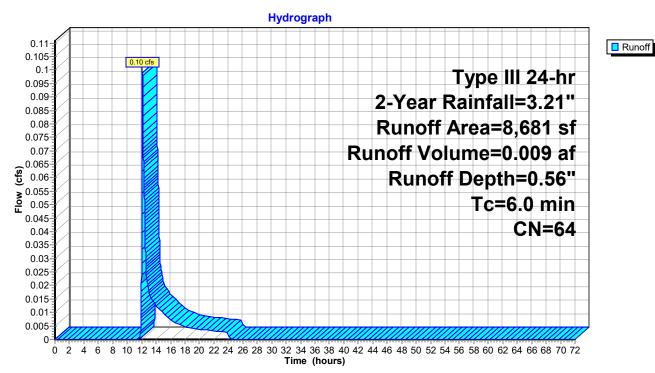
Summary for Subcatchment 2: Subcatchment 2

Runoff = 0.10 cfs @ 12.11 hrs, Volume= 0.009 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.21"

	Α	rea (sf)	CN	Description								
-		2,076	30	Brush, Goo	Brush, Good, HSG A							
		3,179	49	50-75% Gra	50-75% Grass cover, Fair, HSG A							
*		3,211	98	Gravel park	Gravel parking, HSG A							
		215	98	, o								
		8,681	681 64 Weighted Average									
		5,255		60.53% Pervious Area								
		3,426		39.47% Imp	pervious Ar	ırea						
	Tc	Length	Slop	e Velocity	Capacity	/ Description						
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)							
	6.0					Direct Entry,						

Subcatchment 2: Subcatchment 2



Page 13

Summary for Link DP-1: Reservoir and Swimming Area

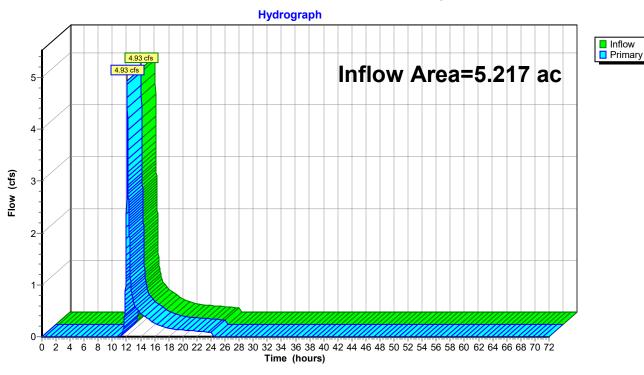
Inflow Area = 5.217 ac, 38.51% Impervious, Inflow Depth = 0.88" for 2-Year event

Inflow = 4.93 cfs @ 12.10 hrs, Volume= 0.384 af

Primary = 4.93 cfs @ 12.10 hrs, Volume= 0.384 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area



Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

<u>Page 14</u>

Summary for Link DP-2: Ditch

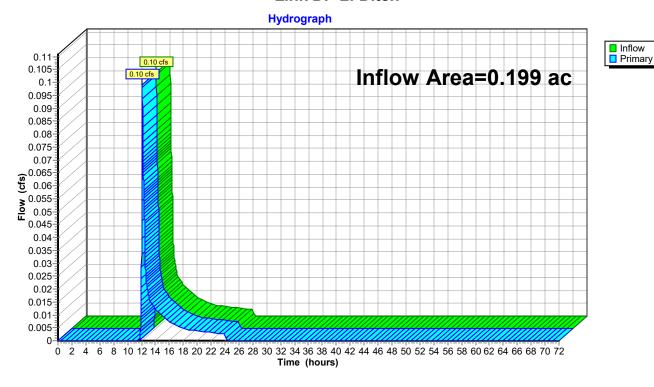
Inflow Area = 0.199 ac, 39.47% Impervious, Inflow Depth = 0.56" for 2-Year event

Inflow = 0.10 cfs @ 12.11 hrs, Volume= 0.009 af

Primary = 0.10 cfs @ 12.11 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Type III 24-hr 10-Year Rainfall=4.86"

Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020

<u>Page 15</u>

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=2.01"

Tc=6.0 min CN=71 Runoff=12.11 cfs 0.874 af

Subcatchment 2: Subcatchment 2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=1.49"

Tc=6.0 min CN=64 Runoff=0.33 cfs 0.025 af

Link DP-1: Reservoir and Swimming Area Inflow=12.11 cfs 0.874 af

Primary=12.11 cfs 0.874 af

Link DP-2: Ditch Inflow=0.33 cfs 0.025 af

Primary=0.33 cfs 0.025 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.899 af Average Runoff Depth = 1.99" 61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Printed 10/6/2020 Page 16

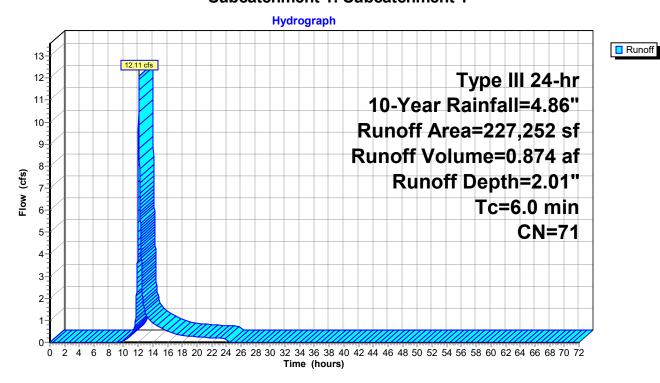
Summary for Subcatchment 1: Subcatchment 1

Runoff = 12.11 cfs @ 12.09 hrs, Volume= 0.874 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.86"

	Α	rea (sf)	CN	Description						
		14,435	30	Brush, Good, HSG A						
*		57,370	63	Beach Sand	d, HSG A					
*		1,998	96	Dense San	d Path, HS	G A				
		63,530	49	50-75% Gra	50-75% Grass cover, Fair, HSG A					
*		24,927	98	Gravel park	ing, HSG A	1				
*		9,994	98	Impervious	Surface, H	SG A				
		52,585	98	Water Surfa	Nater Surface, HSG A					
*		2,413	39	Open Space, Good, HSG A (>75% Grass Cover)						
	2	27,252	71	Weighted A	verage					
	1	39,746		61.49% Per	vious Area					
		87,506		38.51% Imp	ervious Ar	ea				
				•						
	Tc	Length	Slop	e Velocity	Capacity	Description				
	(min)	(feet)	(ft/ft	(ft/sec)	(cfs)					
<u></u>	6.0	•				Direct Entry,				

Subcatchment 1: Subcatchment 1



Page 17

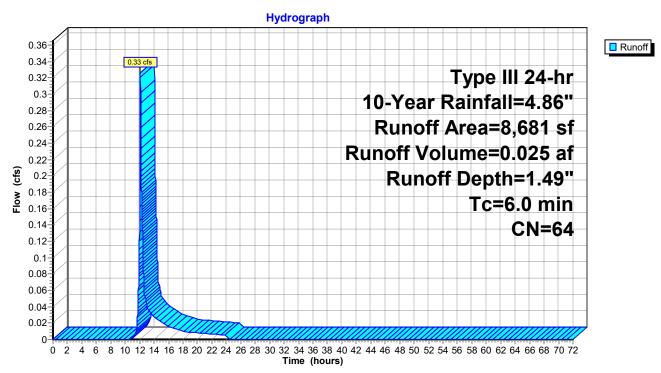
Summary for Subcatchment 2: Subcatchment 2

Runoff = 0.33 cfs @ 12.10 hrs, Volume= 0.025 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.86"

	Α	rea (sf)	CN	Description								
-		2,076	30	Brush, Goo	Brush, Good, HSG A							
		3,179	49	50-75% Gra	50-75% Grass cover, Fair, HSG A							
*		3,211	98	Gravel park	Gravel parking, HSG A							
		215	98	, o								
		8,681	681 64 Weighted Average									
		5,255		60.53% Pervious Area								
		3,426		39.47% Imp	pervious Ar	ırea						
	Tc	Length	Slop	e Velocity	Capacity	/ Description						
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)							
	6.0					Direct Entry,						

Subcatchment 2: Subcatchment 2



Prepared by Woodard Curran

HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 18

Summary for Link DP-1: Reservoir and Swimming Area

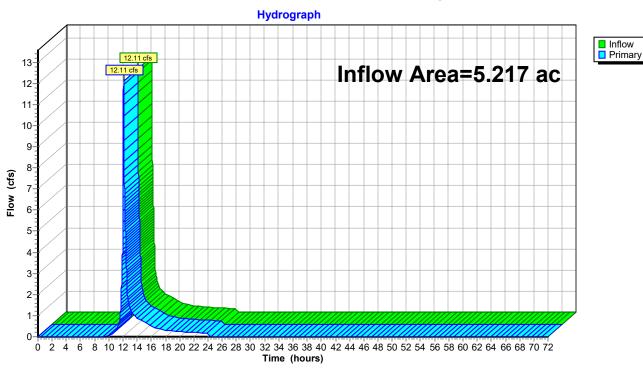
Inflow Area = 5.217 ac, 38.51% Impervious, Inflow Depth = 2.01" for 10-Year event

Inflow = 12.11 cfs @ 12.09 hrs, Volume= 0.874 af

Primary = 12.11 cfs @ 12.09 hrs, Volume= 0.874 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area



Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 19

Summary for Link DP-2: Ditch

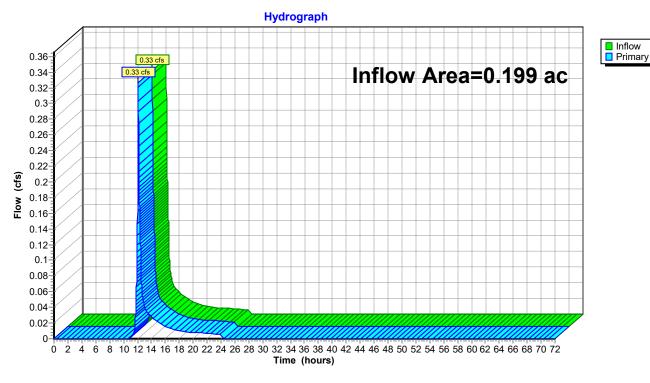
Inflow Area = 0.199 ac, 39.47% Impervious, Inflow Depth = 1.49" for 10-Year event

Inflow = 0.33 cfs @ 12.10 hrs, Volume= 0.025 af

Primary = 0.33 cfs @ 12.10 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Type III 24-hr 25-Year Rainfall=6.17"

Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020 Page 20

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=3.04"

Tc=6.0 min CN=71 Runoff=18.53 cfs 1.320 af

Subcatchment 2: Subcatchment 2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=2.39"

Tc=6.0 min CN=64 Runoff=0.54 cfs 0.040 af

Link DP-1: Reservoir and Swimming Area Inflow=18.53 cfs 1.320 af

Primary=18.53 cfs 1.320 af

Link DP-2: Ditch Inflow=0.54 cfs 0.040 af

Primary=0.54 cfs 0.040 af

Total Runoff Area = 5.416 ac Runoff Volume = 1.360 af Average Runoff Depth = 3.01" 61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Printed 10/6/2020 Page 21

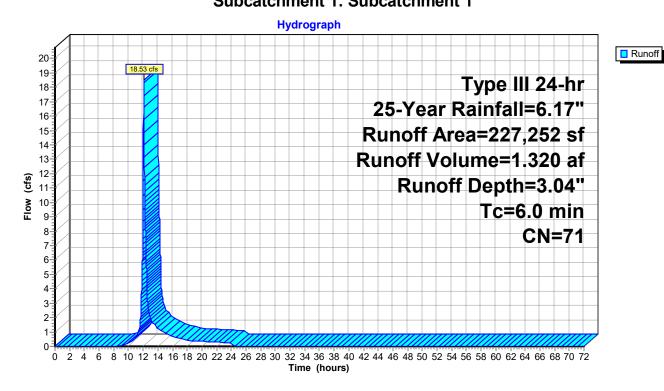
Summary for Subcatchment 1: Subcatchment 1

Runoff = 18.53 cfs @ 12.09 hrs, Volume= 1.320 af, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.17"

	Α	rea (sf)	CN	Description							
		14,435	30	Brush, Good, HSG A							
*		57,370	63	Beach Sand	d, HSG A						
*		1,998	96	Dense Sand	d Path, HS	G A					
		63,530	49	50-75% Gra	50-75% Grass cover, Fair, HSG A						
*		24,927	98	Gravel park	ing, HSG A	4					
*		9,994	98	Impervious	Surface, H	ISG A					
		52,585	98	Water Surfa	ace, HSG A	4					
*		2,413	39	Open Space, Good, HSG A (>75% Grass Cover)							
	2	27,252	71	Weighted A	verage						
	1	39,746		61.49% Per	ervious Area						
		87,506		38.51% Imp	ervious Ar	rea					
	Tc	Length	Slop	e Velocity	Capacity	Description					
	(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)						
	6.0					Direct Entry,					

Subcatchment 1: Subcatchment 1



Printed 10/6/2020 Page 22

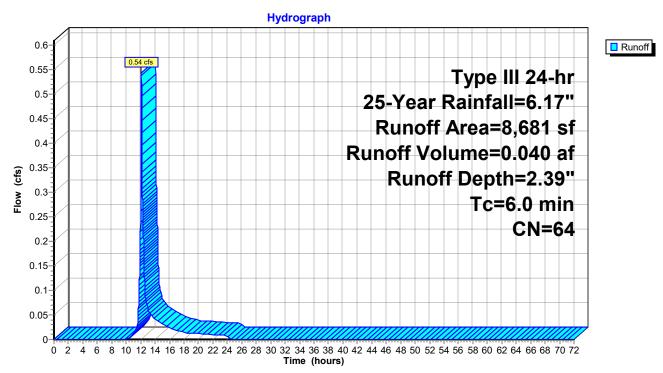
Summary for Subcatchment 2: Subcatchment 2

Runoff = 0.54 cfs @ 12.09 hrs, Volume= 0.040 af, Depth= 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.17"

	Α	rea (sf)	CN	Description								
		2,076	30	Brush, Goo	Brush, Good, HSG A							
		3,179	49	50-75% Grass cover, Fair, HSG A								
*		3,211	98	Gravel park	Gravel parking, HSG A							
		215										
		8,681	8,681 64 Weighted Average									
		5,255		60.53% Pervious Area								
		3,426		39.47% Imp	pervious Ar	rea						
	Tc	Length	Slope	e Velocity	Capacity	Description						
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)	<u> </u>						
	6.0					Direct Entry,						

Subcatchment 2: Subcatchment 2



Prepared by Woodard Curran

HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020 Page 23

Summary for Link DP-1: Reservoir and Swimming Area

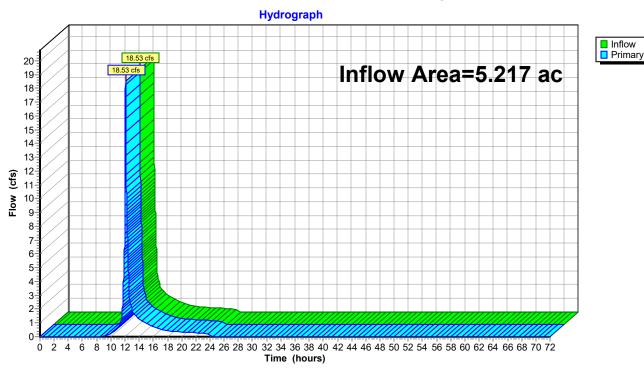
Inflow Area = 5.217 ac, 38.51% Impervious, Inflow Depth = 3.04" for 25-Year event

Inflow = 18.53 cfs @ 12.09 hrs, Volume= 1.320 af

Primary = 18.53 cfs @ 12.09 hrs, Volume= 1.320 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area



Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020

Page 24

Summary for Link DP-2: Ditch

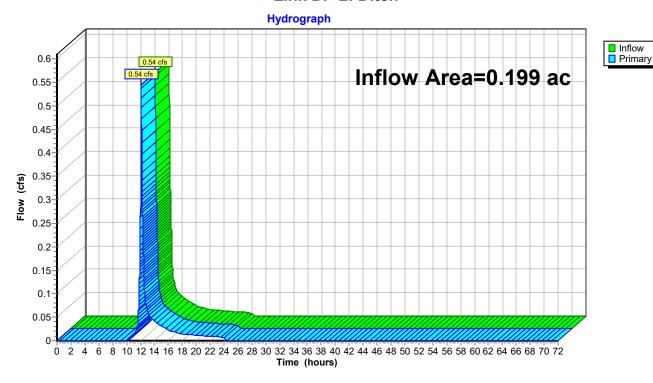
Inflow Area = 0.199 ac, 39.47% Impervious, Inflow Depth = 2.39" for 25-Year event

Inflow = 0.54 cfs @ 12.09 hrs, Volume= 0.040 af

Primary = 0.54 cfs @ 12.09 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Type III 24-hr 100-Year Rainfall=8.85" Printed 10/6/2020

Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 25

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=5.33"

Tc=6.0 min CN=71 Runoff=32.53 cfs 2.315 af

Subcatchment 2: Subcatchment 2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=4.47"

Tc=6.0 min CN=64 Runoff=1.04 cfs 0.074 af

Link DP-1: Reservoir and Swimming Area Inflow=32.53 cfs 2.315 af

Primary=32.53 cfs 2.315 af

Link DP-2: Ditch Inflow=1.04 cfs 0.074 af

Primary=1.04 cfs 0.074 af

Total Runoff Area = 5.416 ac Runoff Volume = 2.389 af Average Runoff Depth = 5.29" 61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Page 26

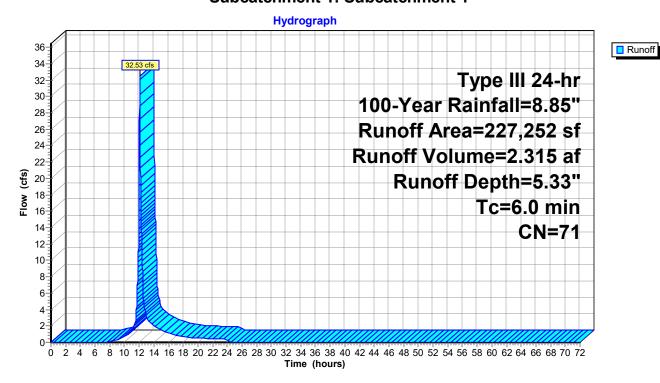
Summary for Subcatchment 1: Subcatchment 1

Runoff = 32.53 cfs @ 12.09 hrs, Volume= 2.315 af, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.85"

	Α	rea (sf)	CN	Description						
		14,435	30	Brush, Good, HSG A						
*		57,370	63	Beach Sand	d, HSG A					
*		1,998	96	Dense San	d Path, HS	G A				
		63,530	49	50-75% Gra	50-75% Grass cover, Fair, HSG A					
*		24,927	98	Gravel park	ing, HSG A	1				
*		9,994	98	Impervious	Surface, H	SG A				
		52,585	98	Water Surfa	Nater Surface, HSG A					
*		2,413	39	Open Space, Good, HSG A (>75% Grass Cover)						
	2	27,252	71	Weighted A	verage					
	1	39,746		61.49% Per	vious Area					
		87,506		38.51% Imp	ervious Ar	ea				
				•						
	Tc	Length	Slop	e Velocity	Capacity	Description				
	(min)	(feet)	(ft/ft	(ft/sec)	(cfs)					
<u></u>	6.0	•				Direct Entry,				

Subcatchment 1: Subcatchment 1



Prepared by Woodard Curran

HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 27

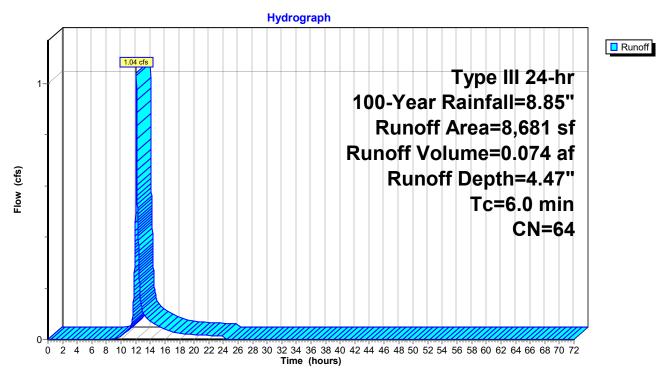
Summary for Subcatchment 2: Subcatchment 2

Runoff = 1.04 cfs @ 12.09 hrs, Volume= 0.074 af, Depth= 4.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.85"

	Area (sf)	CN	Description								
•	2,076	30	Brush, Goo	Brush, Good, HSG A							
	3,179	49	50-75% Grass cover, Fair, HSG A								
*	3,211	98	Gravel park	Gravel parking, HSG A							
	215	98	Impervious Surface, HSG A								
•	8,681	8,681 64 Weighted Average									
	5,255		60.53% Pervious Area								
	3,426		39.47% Imp	pervious Ar	ırea						
Tc	Length	Slop	e Velocity	Capacity	/ Description						
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)							
6.0					Direct Entry,						

Subcatchment 2: Subcatchment 2



Prepared by Woodard Curran

HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 28

Summary for Link DP-1: Reservoir and Swimming Area

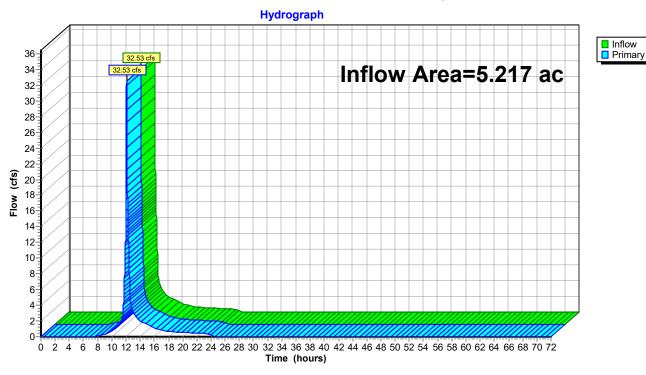
Inflow Area = 5.217 ac, 38.51% Impervious, Inflow Depth = 5.33" for 100-Year event

Inflow = 32.53 cfs @ 12.09 hrs, Volume= 2.315 af

Primary = 32.53 cfs @ 12.09 hrs, Volume= 2.315 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area



Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 29

Summary for Link DP-2: Ditch

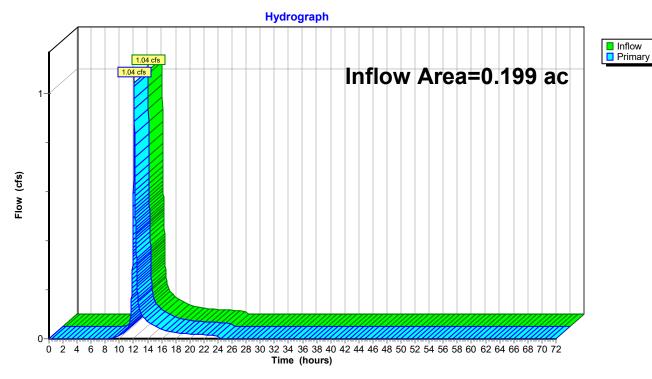
Inflow Area = 0.199 ac, 39.47% Impervious, Inflow Depth = 4.47" for 100-Year event

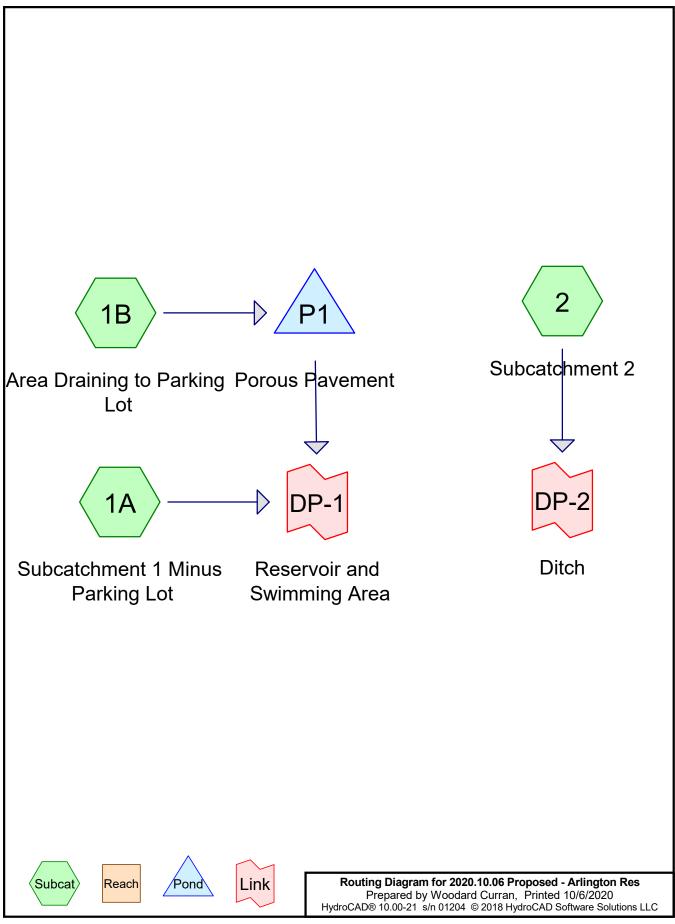
Inflow = 1.04 cfs @ 12.09 hrs, Volume= 0.074 af

Primary = 1.04 cfs @ 12.09 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch





Printed 10/6/2020 Page 2

Area Listing (selected nodes)

A	Area	CN	Description
(ac	res)		(subcatchment-numbers)
1.	573	39	>75% Grass cover, Good, HSG A (1A, 1B, 2)
1.	029	63	Beach Sand, HSG A (1A)
0.	304	30	Brush, Good, HSG A (1A)
0.	467	98	Impervious Surface, HSG A (1A, 1B)
0.	184	39	Permeable Playground Surface, Good, HSG A (1A)
0.	521	98	Porous Pavement, HSG A (1A, 1B)
0.	138	96	Stone Dust, HSG A (1A)
1.	200	98	Water Surface, HSG A (1A)
5.	416	68	TOTAL AREA

Printed 10/6/2020

Page 3

Soil Listing (selected nodes)

Area	Soil	Subcatchment
(acres)	Group	Numbers
5.416	HSG A	1A, 1B, 2
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
5.416		TOTAL AREA

Printed 10/6/2020 Page 4

Ground Covers (selected nodes)

HSG-A	HSG-B	HSG-C	HSG-D	Other	Total	Ground	Subcatch
(acres)	(acres)	(acres)	(acres)	(acres)	(acres)	Cover	Numbers
1.573	0.000	0.000	0.000	0.000	1.573	>75% Grass cover, Good	_
1.029	0.000	0.000	0.000	0.000	1.029	Beach Sand	
0.304	0.000	0.000	0.000	0.000	0.304	Brush, Good	
0.467	0.000	0.000	0.000	0.000	0.467	Impervious Surface	
0.184	0.000	0.000	0.000	0.000	0.184	Permeable Playground Surface,	
						Good	
0.521	0.000	0.000	0.000	0.000	0.521	Porous Pavement	
0.138	0.000	0.000	0.000	0.000	0.138	Stone Dust	
1.200	0.000	0.000	0.000	0.000	1.200	Water Surface	
5.416	0.000	0.000	0.000	0.000	5.416	TOTAL AREA	

Printed 10/6/2020

Page 5

Pipe Listing (selected nodes)

Line#	Node	In-Invert	Out-Invert	Length	Slope	n	Diam/Width	Height	Inside-Fill
	Number	(feet)	(feet)	(feet)	(ft/ft)		(inches)	(inches)	(inches)
1	P1	162.15	162.05	20.0	0.0050	0.013	12.0	0.0	0.0

2020.10.06 Proposed - Arlington Res

Type III 24-hr 1-Year Rainfall=2.67"

Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020 Page 6

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=0.43"

Tc=6.0 min CN=67 Runoff=1.65 cfs 0.166 af

Subcatchment 1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=1.07"

Tc=6.0 min CN=81 Runoff=0.84 cfs 0.061 af

Subcatchment 2: Subcatchment 2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.00"

Tc=6.0 min CN=39 Runoff=0.00 cfs 0.000 af

Pond P1: Porous Pavement Peak Elev=161.40' Storage=0 cf Inflow=0.84 cfs 0.061 af

Discarded=0.84 cfs 0.061 af Primary=0.00 cfs 0.000 af Outflow=0.84 cfs 0.061 af

Link DP-1: Reservoir and Swimming Area Inflow=1.65 cfs 0.166 af

Primary=1.65 cfs 0.166 af

Link DP-2: Ditch Inflow=0.00 cfs 0.000 af

Primary=0.00 cfs 0.000 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.227 af Average Runoff Depth = 0.50" 59.60% Pervious = 3.228 ac 40.40% Impervious = 2.188 ac

Printed 10/6/2020 Page 7

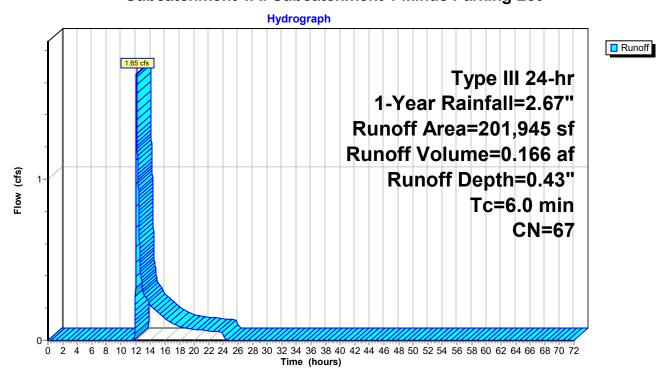
Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

Runoff = 1.65 cfs @ 12.11 hrs, Volume= 0.166 af, Depth= 0.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 1-Year Rainfall=2.67"

	Α	rea (sf)	CN	Description						
		13,237	30	Brush, Good, HSG A						
*		44,830	63	Beach Sand	Beach Sand, HSG A					
		56,001	39	>75% Gras	>75% Grass cover, Good, HSG A					
		19,764	98	Impervious	Surface, H	SG A				
*		1,800	98	Porous Pav	ement, HS	G A				
		52,292	98	Water Surfa	Water Surface, HSG A					
*		6,010	96	Stone Dust, HSG A						
*		8,011	39	Permeable Playground Surface, Good, HSG A						
201,945 67 Weighted Average				Weighted A						
	128,089 63.43% Pervious Area			63.43% Per	vious Area					
		73,856		36.57% Imp	ervious Ar	ea				
	•									
	Tc	Length	Slop	e Velocity	Capacity	Description				
	(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)	·				
6.0 Direct Entry,						Direct Entry,				

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Printed 10/6/2020 Page 8

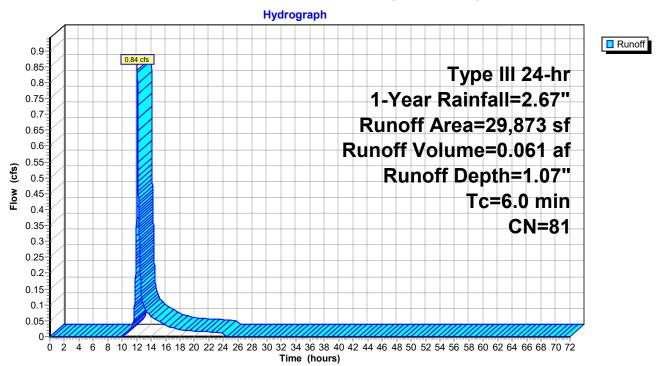
Summary for Subcatchment 1B: Area Draining to Parking Lot

Runoff = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 1-Year Rainfall=2.67"

_	Α	rea (sf)	CN I	Description						
		8,411	39	>75% Grass cover, Good, HSG A						
		574	98	Impervious Surface, HSG A						
*	•	20,888	98	Porous Pavement, HSG A						
		29,873	81 \	Weighted Average						
		8,411	2	28.16% Pervious Area						
		21,462		71.84% Impervious Area						
	_									
	Тс	Length	Slope	,	Capacity	Description				
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	6.0					Direct Entry,				

Subcatchment 1B: Area Draining to Parking Lot



Page 9

Summary for Subcatchment 2: Subcatchment 2

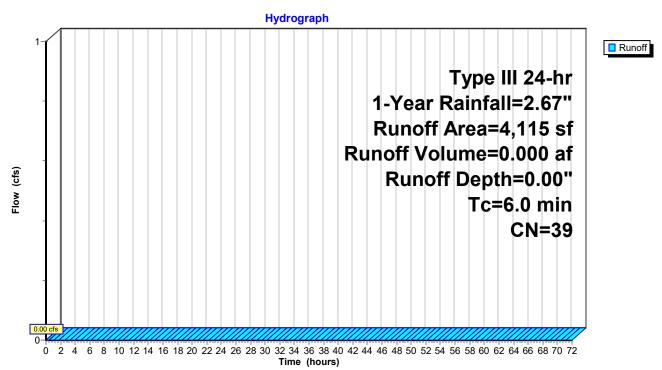
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 1-Year Rainfall=2.67"

A	rea (sf)	CN [Description						
	4,115	39 >	>75% Grass cover, Good, HSG A						
	4,115	•	100.00% Pervious Area						
_		-							
Tc	Length	Slope	•		Description				
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
6.0					Direct Entry.				

Subcatchment 2: Subcatchment 2



Prepared by Woodard Curran

Printed 10/6/2020

HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 10

Summary for Pond P1: Porous Pavement

Inflow Area = 0.686 ac, 71.84% Impervious, Inflow Depth = 1.07" for 1-Year event

Inflow = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af

Outflow = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min

Discarded = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Peak Elev= 161.40' @ 12.09 hrs Surf.Area= 21,411 sf Storage= 0 cf Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 0.0 min (849.0 - 849.0)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
			17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	161.73'	23 cf	4.0" Round Pipe Storage Inside #1
			L= 258.0'

11,383 cf Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

Surf.Area	Voids	Inc.Store	Cum.Store
(sq-ft)	(%)	(cubic-feet)	(cubic-feet)
21,411	0.0	0	0
21,411	40.0	2,141	2,141
21,411	30.0	2,120	4,261
	(sq-ft) 21,411 21,411	21,411 0.0 21,411 40.0	(sq-ft) (%) (cubic-feet) 21,411 0.0 0 21,411 40.0 2,141

e Routing	Invert	Outlet Devices
Primary	162.15'	12.0" Round Culvert
•		L= 20.0' CPP, mitered to conform to fill, Ke= 0.700
		Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900
		n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
Device 1	161.73'	4.0" Vert. Orifice/Grate C= 0.600
B Discarded	161.40'	2.410 in/hr Exfiltration over Surface area
֡	Primary Device 1	Primary 162.15' Device 1 161.73'

Discarded OutFlow Max=1.19 cfs @ 12.09 hrs HW=161.40' (Free Discharge) **3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)

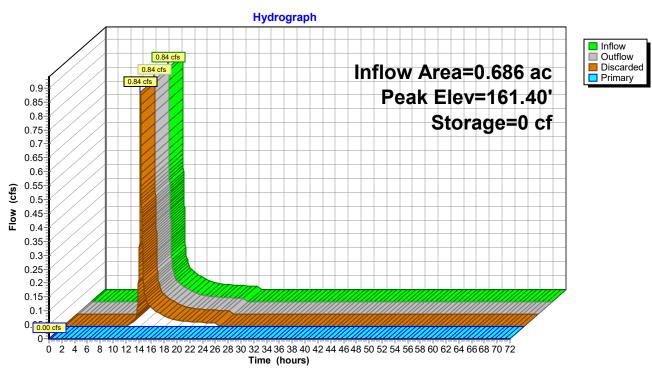
1=Culvert (Controls 0.00 cfs)

2=Orifice/Grate (Controls 0.00 cfs)

Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 11

Pond P1: Porous Pavement



Prepared by Woodard Curran HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 12

Summary for Link DP-1: Reservoir and Swimming Area

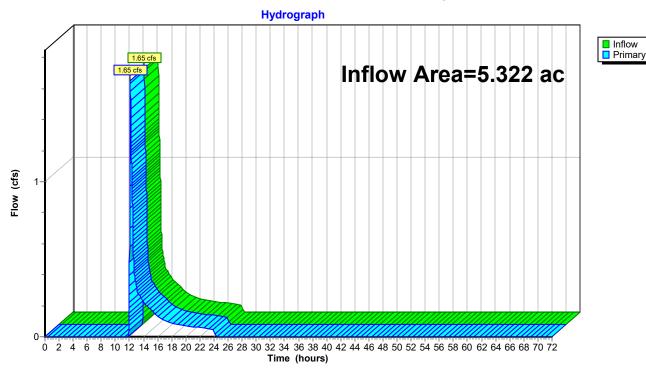
Inflow Area = 5.322 ac, 41.12% Impervious, Inflow Depth = 0.37" for 1-Year event

Inflow 1.65 cfs @ 12.11 hrs, Volume= 0.166 af

1.65 cfs @ 12.11 hrs, Volume= Primary 0.166 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area



Prepared by Woodard Curran

HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 13

Summary for Link DP-2: Ditch

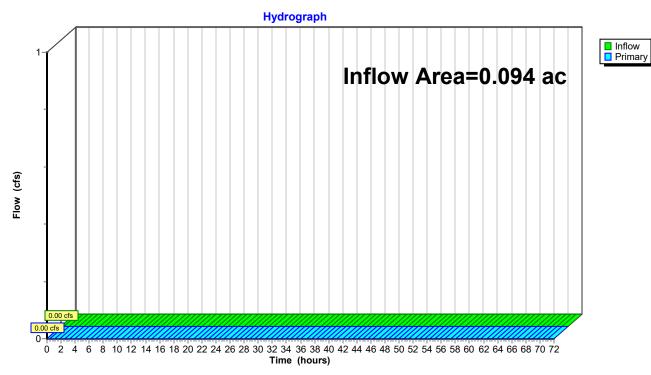
Inflow Area = 0.094 ac, 0.00% Impervious, Inflow Depth = 0.00" for 1-Year event

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



2020.10.06 Proposed - Arlington Res

Type III 24-hr 2-Year Rainfall=3.21"

Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020 Page 14

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=0.69"

Tc=6.0 min CN=67 Runoff=3.15 cfs 0.267 af

Subcatchment 1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=1.48"

Tc=6.0 min CN=81 Runoff=1.18 cfs 0.084 af

Subcatchment 2: Subcatchment 2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.00"

Tc=6.0 min CN=39 Runoff=0.00 cfs 0.000 af

Pond P1: Porous Pavement Peak Elev=161.40' Storage=1 cf Inflow=1.18 cfs 0.084 af

Discarded=1.17 cfs 0.084 af Primary=0.00 cfs 0.000 af Outflow=1.17 cfs 0.084 af

Link DP-1: Reservoir and Swimming Area Inflow=3.15 cfs 0.267 af

Primary=3.15 cfs 0.267 af

Link DP-2: Ditch Inflow=0.00 cfs 0.000 af

Primary=0.00 cfs 0.000 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.352 af Average Runoff Depth = 0.78" 59.60% Pervious = 3.228 ac 40.40% Impervious = 2.188 ac

Page 15

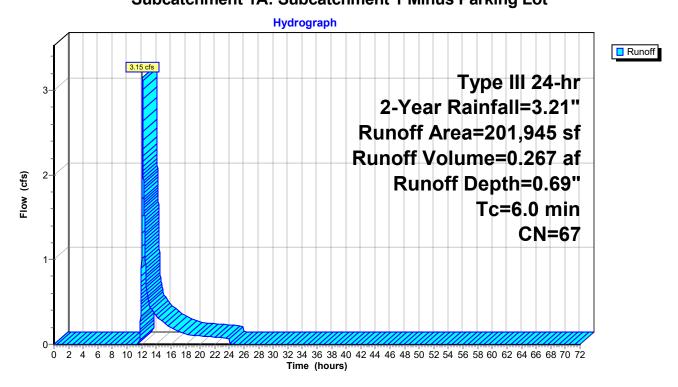
Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

Runoff = 3.15 cfs @ 12.10 hrs, Volume= 0.267 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.21"

	Α	rea (sf)	CN	Description						
		13,237	30	Brush, Good, HSG A						
*		44,830	63	Beach Sand	Beach Sand, HSG A					
		56,001	39	>75% Gras	>75% Grass cover, Good, HSG A					
		19,764	98	Impervious	Surface, H	SG A				
*		1,800	98	Porous Pav	ement, HS	G A				
		52,292	98	Water Surfa	Water Surface, HSG A					
*		6,010	96	Stone Dust, HSG A						
*		8,011	39	Permeable Playground Surface, Good, HSG A						
201,945 67 Weighted Average				Weighted A						
	128,089 63.43% Pervious Area			63.43% Per	vious Area					
		73,856		36.57% Imp	ervious Ar	ea				
	•									
	Tc	Length	Slop	e Velocity	Capacity	Description				
	(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)	·				
6.0 Direct Entry,						Direct Entry,				

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Page 16

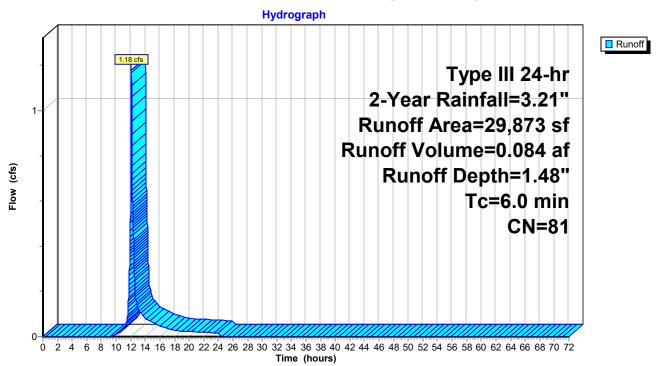
Summary for Subcatchment 1B: Area Draining to Parking Lot

Runoff = 1.18 cfs @ 12.09 hrs, Volume= 0.084 af, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.21"

	Area (sf)	CN	Description						
	8,411	39	>75% Grass	>75% Grass cover, Good, HSG A					
	574	98	Impervious	Impervious Surface, HSG A					
*	20,888	98	Porous Pav	Porous Pavement, HSG A					
	29,873	81	Weighted A	Weighted Average					
	8,411		28.16% Pervious Area						
	21,462		71.84% Impervious Area						
	Tc Length	Slop	oe Velocity	Capacity	Description				
	(min) (feet)	(ft/	ft) (ft/sec)	(cfs)					
	6.0	•	•	•	Direct Entry.				

Subcatchment 1B: Area Draining to Parking Lot



Printed 10/6/2020 Page 17

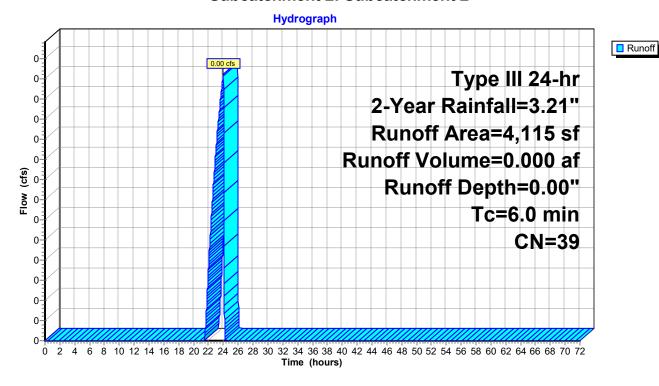
Summary for Subcatchment 2: Subcatchment 2

Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 2-Year Rainfall=3.21"

A	rea (sf)	CN E	Description						
	4,115	39 >	>75% Grass cover, Good, HSG A						
	4,115	1	100.00% Pervious Area						
Tc (min)	Length (feet)	Slope (ft/ft)	pe Velocity Capacity Description ft) (ft/sec) (cfs)						
6.0					Direct Entry,				

Subcatchment 2: Subcatchment 2



Printed 10/6/2020

Page 18

Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=547)

0.686 ac, 71.84% Impervious, Inflow Depth = 1.48" for 2-Year event Inflow Area = Inflow 1.18 cfs @ 12.09 hrs, Volume= 0.084 af 1.17 cfs @ 12.10 hrs, Volume= Outflow 0.084 af, Atten= 0%, Lag= 0.4 min

Discarded = 1.17 cfs @ 12.10 hrs, Volume= 0.084 af 0.00 cfs @ 0.00 hrs. Volume= Primary 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Peak Elev= 161.40' @ 12.10 hrs Surf.Area= 21,411 sf Storage= 1 cf Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 0.0 min (839.4 - 839.4)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
			17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	161.73'	23 cf	4.0" Round Pipe Storage Inside #1
			L= 258.0'

11,383 cf Total Available Storage

Elevation	Surf.Area	Inc.Store	Cum.Store
(feet)	(sq-ft)	(cubic-feet)	(cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

Elevation	Surf.Area	Voids	Inc.Store	Cum.Store
(feet)	(sq-ft)	(%)	(cubic-feet)	(cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	12.0" Round Culvert
	•		L= 20.0' CPP, mitered to conform to fill, Ke= 0.700
			Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	4.0" Vert. Orifice/Grate C= 0.600
#3	Discarded	161.40'	2.410 in/hr Exfiltration over Surface area

Discarded OutFlow Max=1.19 cfs @ 12.10 hrs HW=161.40' (Free Discharge) **T_3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)

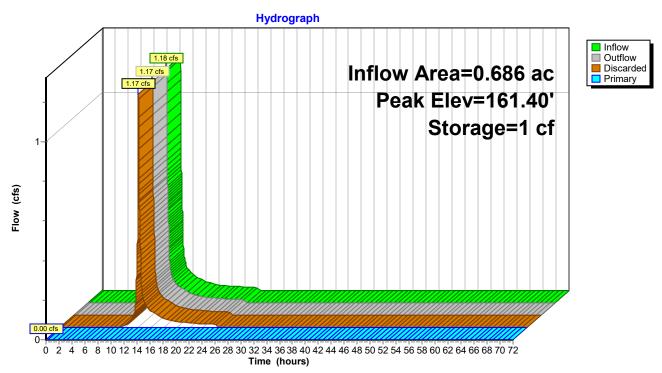
-1=Culvert (Controls 0.00 cfs)

²⁼Orifice/Grate (Controls 0.00 cfs)

Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 19

Pond P1: Porous Pavement



2020.10.06 Proposed - Arlington Res

Prepared by Woodard Curran

HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 20

Summary for Link DP-1: Reservoir and Swimming Area

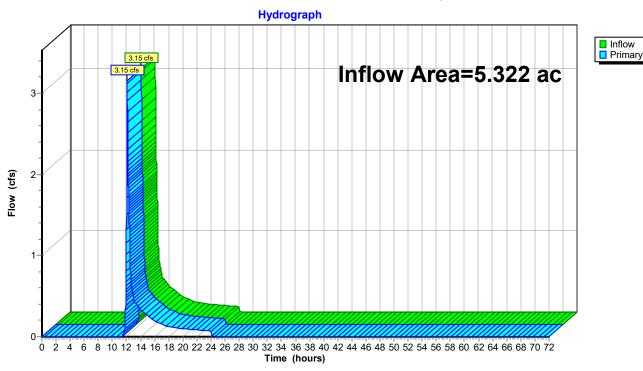
Inflow Area = 5.322 ac, 41.12% Impervious, Inflow Depth = 0.60" for 2-Year event

Inflow = 3.15 cfs @ 12.10 hrs, Volume= 0.267 af

Primary = 3.15 cfs @ 12.10 hrs, Volume= 0.267 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area



Prepared by Woodard Curran

HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 21

Summary for Link DP-2: Ditch

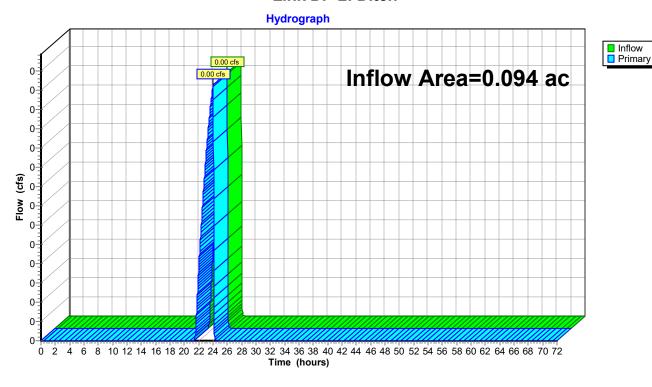
Inflow Area = 0.094 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Year event

Inflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af

Primary = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



2020.10.06 Proposed - Arlington Res

Type III 24-hr 10-Year Rainfall=4.86"

Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020

Page 22

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=1.71"

Tc=6.0 min CN=67 Runoff=8.92 cfs 0.659 af

Subcatchment 1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=2.86"

Tc=6.0 min CN=81 Runoff=2.30 cfs 0.164 af

Subcatchment 2: Subcatchment 2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.17"

Tc=6.0 min CN=39 Runoff=0.00 cfs 0.001 af

Pond P1: Porous Pavement Peak Elev=161.46' Storage=515 cf Inflow=2.30 cfs 0.164 af

Discarded=1.19 cfs 0.164 af Primary=0.00 cfs 0.000 af Outflow=1.19 cfs 0.164 af

Link DP-1: Reservoir and Swimming Area Inflow=8.92 cfs 0.659 af

Primary=8.92 cfs 0.659 af

Link DP-2: Ditch Inflow=0.00 cfs 0.001 af

Primary=0.00 cfs 0.001 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.824 af Average Runoff Depth = 1.83" 59.60% Pervious = 3.228 ac 40.40% Impervious = 2.188 ac

Page 23

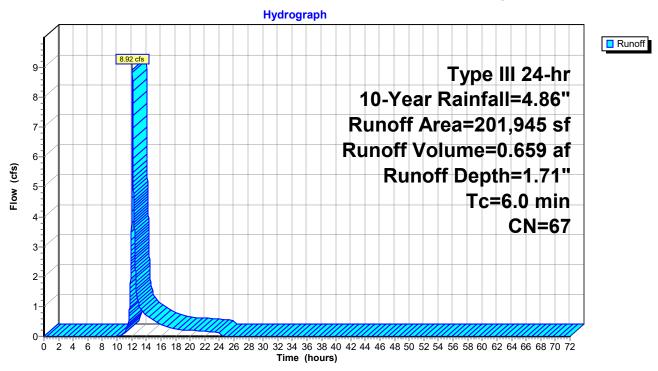
Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

Runoff = 8.92 cfs @ 12.09 hrs, Volume= 0.659 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.86"

	Α	rea (sf)	CN	Description				
		13,237	30	Brush, Goo	Brush, Good, HSG A			
*		44,830	63	Beach Sand	d, HSG A			
		56,001	39	>75% Gras	s cover, Go	ood, HSG A		
		19,764	98	Impervious	Surface, H	SG A		
*		1,800	98	Porous Pav	ement, HS	G A		
		52,292	98	Water Surfa	ace, HSG A			
*		6,010	96	Stone Dust,	HSG A			
*		8,011	39	Permeable	Playground	Surface, Good, HSG A		
	2	201,945	67	Weighted A	verage			
	1	28,089		63.43% Per	vious Area			
		73,856		36.57% Imp	ervious Ar	ea		
	Tc	Length	Slop	e Velocity	Capacity	Description		
_	(min)	(feet)	(ft/ft	(ft/sec)	(cfs)			
	6.0					Direct Entry,		

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Page 24

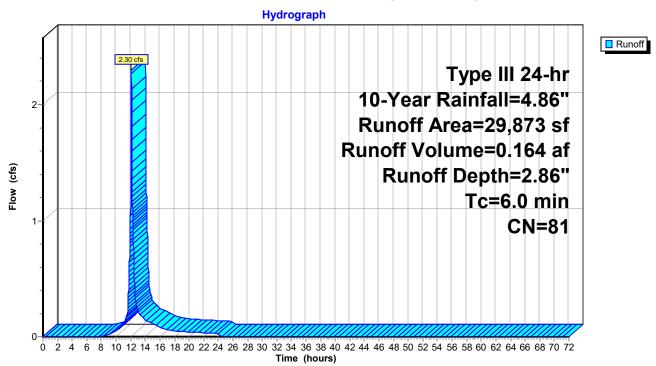
Summary for Subcatchment 1B: Area Draining to Parking Lot

Runoff = 2.30 cfs @ 12.09 hrs, Volume= 0.164 af, Depth= 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf) CN	Description					
	8,41 ⁻	1 39	>75% Gras	s cover, Go	ood, HSG A			
	574	4 98	Impervious	mpervious Surface, HSG A				
*	20,888	98	Porous Pav	ement, HS	G A			
	29,873	3 81	Weighted A	Weighted Average				
	8,41 ⁻	1	28.16% Per	28.16% Pervious Area				
	21,462	2	71.84% Imp	71.84% Impervious Area				
	Tc Leng	th Slo	pe Velocity	Capacity	Description			
	(min) (fee	et) (ft/	ft) (ft/sec)	(cfs)				
	6.0			•	Direct Entry.			

Subcatchment 1B: Area Draining to Parking Lot



Page 25

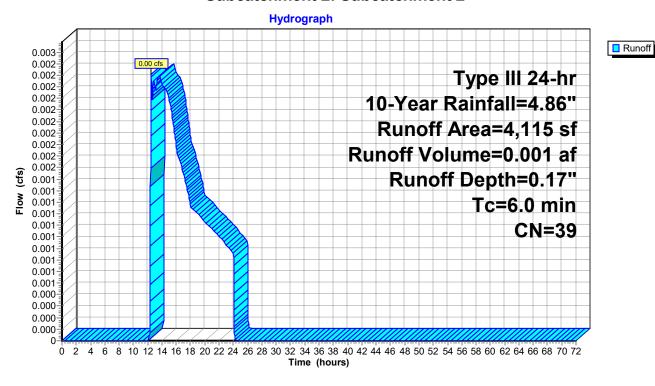
Summary for Subcatchment 2: Subcatchment 2

Runoff = 0.00 cfs @ 12.51 hrs, Volume= 0.001 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 10-Year Rainfall=4.86"

	Α	rea (sf)	CN [Description			
		4,115	39 >	>75% Grass cover, Good, HSG A			
		4,115	1	100.00% Pervious Area			
	Тс	Length	Slope	Velocity	Capacity	Description	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	·	
	6.0					Direct Entry,	

Subcatchment 2: Subcatchment 2



Prepared by Woodard Curran

HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020

Page 26

Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=576)

Inflow Area = 0.686 ac, 71.84% Impervious, Inflow Depth = 2.86" for 10-Year event
Inflow = 2.30 cfs @ 12.09 hrs, Volume= 0.164 af
Outflow = 1.19 cfs @ 12.09 hrs, Volume= 0.164 af, Atten= 48%, Lag= 0.1 min
Discarded = 1.19 cfs @ 12.09 hrs, Volume= 0.164 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Peak Elev= 161.46' @ 12.23 hrs Surf.Area= 21,411 sf Storage= 515 cf Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 1.6 min (821.9 - 820.3)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
			17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	161.73'	23 cf	4.0" Round Pipe Storage Inside #1
			L= 258.0'

11,383 cf Total Available Storage

Elevation	Surf.Area	Inc.Store	Cum.Store
(feet)	(sq-ft)	(cubic-feet)	(cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

Surf.Area	Voids	Inc.Store	Cum.Store
(sq-ft)	(%)	(cubic-feet)	(cubic-feet)
21,411	0.0	0	0
21,411	40.0	2,141	2,141
21,411	30.0	2,120	4,261
	(sq-ft) 21,411 21,411	(sq-ft) (%) 21,411 0.0 21,411 40.0	(sq-ft) (%) (cubic-feet) 21,411 0.0 0 21,411 40.0 2,141

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	12.0" Round Culvert
			L= 20.0' CPP, mitered to conform to fill, Ke= 0.700
			Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	4.0" Vert. Orifice/Grate C= 0.600
#3	Discarded	161.40'	2.410 in/hr Exfiltration over Surface area

Discarded OutFlow Max=1.19 cfs @ 12.09 hrs HW=161.43' (Free Discharge) **3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)

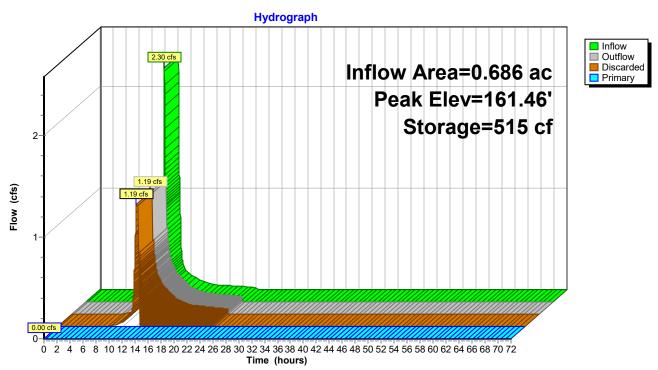
1=Culvert (Controls 0.00 cfs)

²⁼Orifice/Grate (Controls 0.00 cfs)

Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 27

Pond P1: Porous Pavement



Page 28

Summary for Link DP-1: Reservoir and Swimming Area

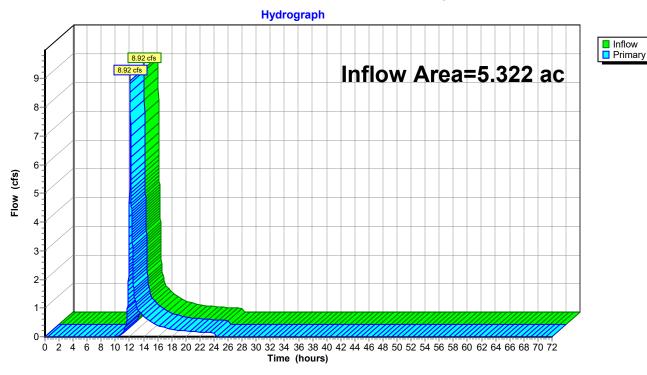
Inflow Area = 5.322 ac, 41.12% Impervious, Inflow Depth = 1.49" for 10-Year event

Inflow = 8.92 cfs @ 12.09 hrs, Volume= 0.659 af

Primary = 8.92 cfs @ 12.09 hrs, Volume= 0.659 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area



Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 29

Summary for Link DP-2: Ditch

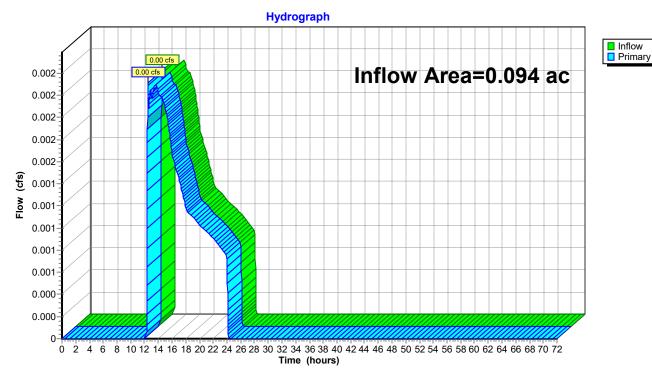
Inflow Area = 0.094 ac, 0.00% Impervious, Inflow Depth = 0.17" for 10-Year event

Inflow = 0.00 cfs @ 12.51 hrs, Volume= 0.001 af

Primary = 0.00 cfs @ 12.51 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



2020.10.06 Proposed - Arlington Res

Type III 24-hr 25-Year Rainfall=6.17"

Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020

<u>Page 30</u>

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=2.66"

Tc=6.0 min CN=67 Runoff=14.29 cfs 1.027 af

Subcatchment 1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=4.04"

Tc=6.0 min CN=81 Runoff=3.22 cfs 0.231 af

Subcatchment 2: Subcatchment 2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.50"

Tc=6.0 min CN=39 Runoff=0.02 cfs 0.004 af

Pond P1: Porous Pavement Peak Elev=161.55' Storage=1,280 cf Inflow=3.22 cfs 0.231 af

Discarded=1.19 cfs 0.231 af Primary=0.00 cfs 0.000 af Outflow=1.19 cfs 0.231 af

Link DP-1: Reservoir and Swimming Area Inflow=14.29 cfs 1.027 af

Primary=14.29 cfs 1.027 af

Link DP-2: Ditch Inflow=0.02 cfs 0.004 af

Primary=0.02 cfs 0.004 af

Total Runoff Area = 5.416 ac Runoff Volume = 1.262 af Average Runoff Depth = 2.80" 59.60% Pervious = 3.228 ac 40.40% Impervious = 2.188 ac

Printed 10/6/2020 Page 31

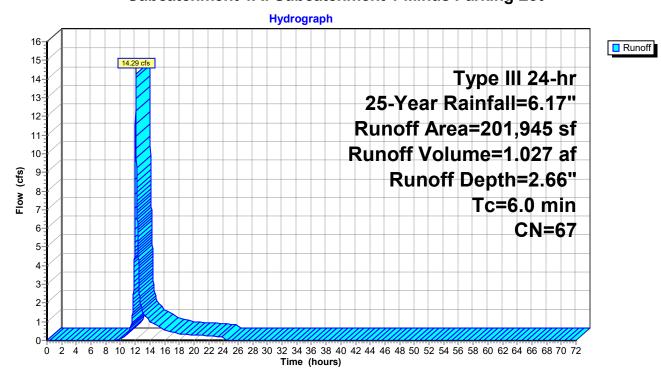
Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

Runoff = 14.29 cfs @ 12.09 hrs, Volume= 1.027 af, Depth= 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.17"

	Α	rea (sf)	CN	Description					
		13,237	30	Brush, Goo	Brush, Good, HSG A				
*		44,830	63	Beach Sand	d, HSG A				
		56,001	39	>75% Gras	s cover, Go	ood, HSG A			
		19,764	98	Impervious	Surface, H	SG A			
*		1,800	98	Porous Pav	ement, HS	G A			
		52,292	98	Water Surfa	ace, HSG A	1			
*		6,010	96	Stone Dust,	HSG A				
*		8,011	39	Permeable Playground Surface, Good, HSG A					
	2	201,945	67	Weighted A	verage				
	1	28,089		63.43% Per	vious Area				
		73,856		36.57% Imp	ervious Ar	ea			
	Tc	Length	Slop	e Velocity	Capacity	Description			
	(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)				
	6.0					Direct Entry,			

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Page 32

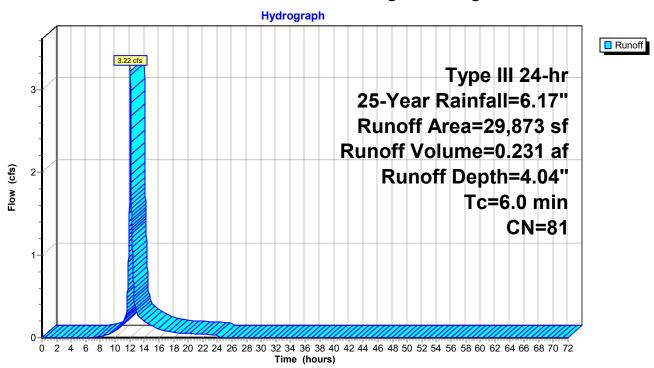
Summary for Subcatchment 1B: Area Draining to Parking Lot

3.22 cfs @ 12.09 hrs, Volume= 0.231 af, Depth= 4.04" Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.17"

	Area (sf) CN	Description					
	8,41 ⁻	1 39	>75% Gras	>75% Grass cover, Good, HSG A				
	574	4 98	Impervious	Impervious Surface, HSG A				
*	20,888	98	Porous Pav	ement, HS	G A			
	29,873	3 81	Weighted A	verage				
	8,41 ⁻	1	28.16% Per	28.16% Pervious Area				
	21,462	2	71.84% Imp	71.84% Impervious Area				
	Tc Leng	th Slo	pe Velocity	Capacity	Description			
	(min) (fee	et) (ft/	ft) (ft/sec)	(cfs)				
	6.0			•	Direct Entry.			

Subcatchment 1B: Area Draining to Parking Lot



Printed 10/6/2020

HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 33

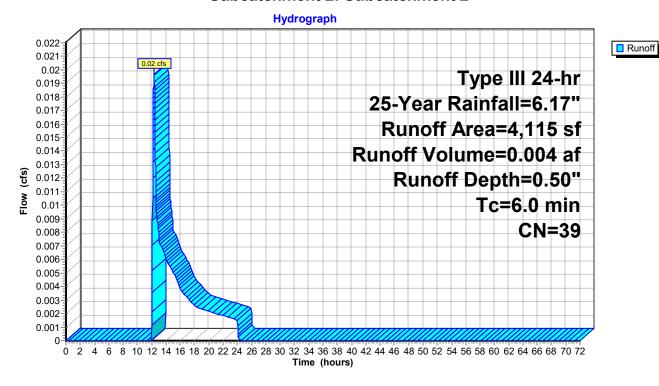
Summary for Subcatchment 2: Subcatchment 2

Runoff = 0.02 cfs @ 12.33 hrs, Volume= 0.004 af, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 25-Year Rainfall=6.17"

A	rea (sf)	CN E	Description				
	4,115	39 >	>75% Grass cover, Good, HSG A				
	4,115	1	100.00% Pervious Area				
Tc (min)	Length (feet)	Slope (ft/ft)	Slope Velocity Capacity Description (ft/ft) (ft/sec) (cfs)				
6.0					Direct Entry,		

Subcatchment 2: Subcatchment 2



Prepared by Woodard Curran

HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020

Page 34

Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=560)

Inflow Area = 0.686 ac, 71.84% Impervious, Inflow Depth = 4.04" for 25-Year event

Inflow = 3.22 cfs @ 12.09 hrs, Volume= 0.231 af

Outflow = 1.19 cfs @ 12.04 hrs, Volume= 0.231 af, Atten= 63%, Lag= 0.0 min

Discarded = 1.19 cfs @ 12.04 hrs, Volume= 0.231 af

Primary = 0.00 cfs @ 0.00 hrs. Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Peak Elev= 161.55' @ 12.35 hrs Surf.Area= 21,411 sf Storage= 1,280 cf Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow) Center-of-Mass det. time= 4.6 min (815.0 - 810.4)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
			17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	161.73'	23 cf	4.0" Round Pipe Storage Inside #1
			L= 258.0'

11,383 cf Total Available Storage

Elevation	Surf.Area	Inc.Store	Cum.Store
(feet)	(sq-ft)	(cubic-feet)	(cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

Elevation	Surf.Area	Voids	Inc.Store	Cum.Store
(feet)	(sq-ft)	(%)	(cubic-feet)	(cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	12.0" Round Culvert
	•		L= 20.0' CPP, mitered to conform to fill, Ke= 0.700
			Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	4.0" Vert. Orifice/Grate C= 0.600
#3	Discarded	161.40'	2.410 in/hr Exfiltration over Surface area

Discarded OutFlow Max=1.19 cfs @ 12.04 hrs HW=161.43' (Free Discharge) **3=Exfiltration** (Exfiltration Controls 1.19 cfs)

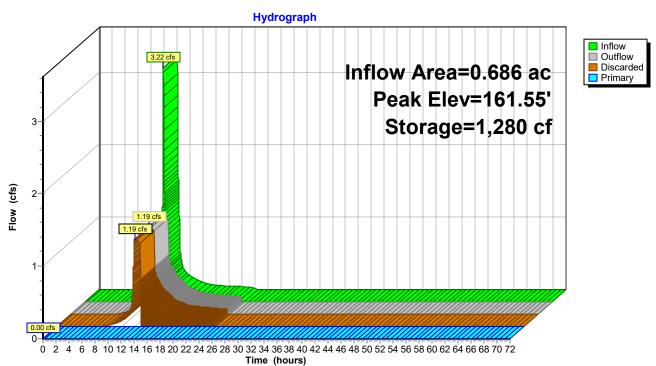
Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

2=Orifice/Grate (Controls 0.00 cfs)

Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 35

Pond P1: Porous Pavement



Printed 10/6/2020

HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 36

Summary for Link DP-1: Reservoir and Swimming Area

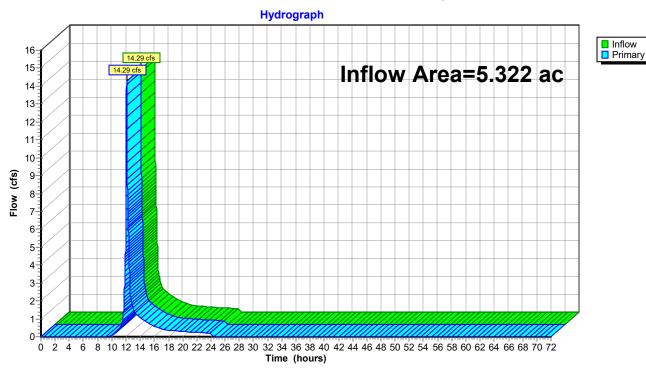
Inflow Area = 5.322 ac, 41.12% Impervious, Inflow Depth = 2.32" for 25-Year event

Inflow = 14.29 cfs @ 12.09 hrs, Volume= 1.027 af

Primary = 14.29 cfs @ 12.09 hrs, Volume= 1.027 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area



Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 37

Summary for Link DP-2: Ditch

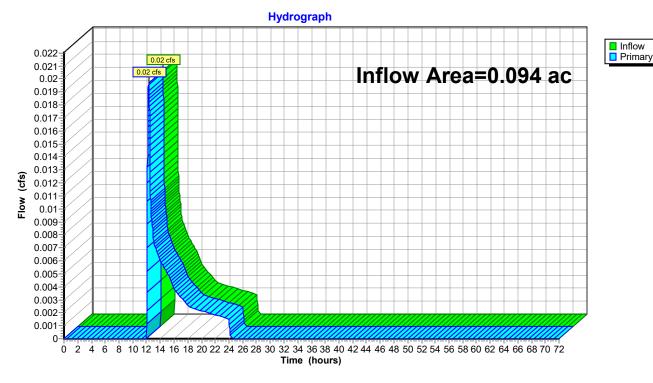
Inflow Area = 0.094 ac, 0.00% Impervious, Inflow Depth = 0.50" for 25-Year event

Inflow = 0.02 cfs @ 12.33 hrs, Volume= 0.004 af

Primary = 0.02 cfs @ 12.33 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



2020.10.06 Proposed - Arlington Res

Type III 24-hr 100-Year Rainfall=8.85"

Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Printed 10/6/2020 Page 38

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=4.84"

Tc=6.0 min CN=67 Runoff=26.30 cfs 1.868 af

Subcatchment 1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=6.55"

Tc=6.0 min CN=81 Runoff=5.13 cfs 0.374 af

Subcatchment 2: Subcatchment 2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=1.53"

Tc=6.0 min CN=39 Runoff=0.13 cfs 0.012 af

Pond P1: Porous Pavement Peak Elev=161.81' Storage=3,521 cf Inflow=5.13 cfs 0.374 af

Discarded=1.19 cfs 0.374 af Primary=0.00 cfs 0.000 af Outflow=1.19 cfs 0.374 af

Link DP-1: Reservoir and Swimming Area Inflow=26.30 cfs 1.868 af

Primary=26.30 cfs 1.868 af

Link DP-2: Ditch Inflow=0.13 cfs 0.012 af

Primary=0.13 cfs 0.012 af

Total Runoff Area = 5.416 ac Runoff Volume = 2.255 af Average Runoff Depth = 5.00" 59.60% Pervious = 3.228 ac 40.40% Impervious = 2.188 ac

Page 39

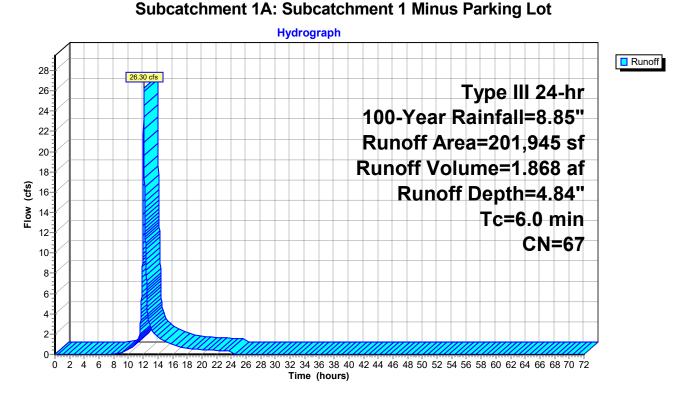
Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

Runoff = 26.30 cfs @ 12.09 hrs, Volume= 1.868 af, Depth= 4.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.85"

	Α	rea (sf)	CN	Description					
		13,237	30	Brush, Goo	d, HSG A				
*		44,830	63	Beach Sand	Beach Sand, HSG A				
		56,001	39	>75% Gras	>75% Grass cover, Good, HSG A				
		19,764	98	Impervious	Impervious Surface, HSG A				
*		1,800	98	Porous Pav	ement, HS	G A			
		52,292	98	Water Surfa	Water Surface, HSG A				
*		6,010	96	Stone Dust	Stone Dust, HSG A				
*		8,011	39	Permeable Playground Surface, Good, HSG A					
	2	201,945	67	Weighted A	verage				
	1	28,089		63.43% Per	vious Area				
	73,856 36.57% Impervious Are			36.57% Imp	ervious Ar	ea			
				•					
	Tc	Length	Slop	e Velocity	Capacity	Description			
	(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)	·			
	6.0					Direct Entry,			

Outrostations at 4.8 Cultivatations and 4.88 and Deutsian



Page 40

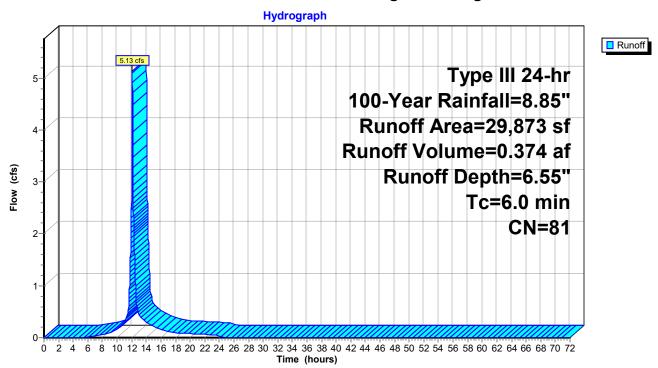
Summary for Subcatchment 1B: Area Draining to Parking Lot

Runoff = 5.13 cfs @ 12.09 hrs, Volume= 0.374 af, Depth= 6.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.85"

	Α	rea (sf)	CN	Description				
_		8,411	39	>75% Gras	s cover, Go	ood, HSG A		
		574	98	Impervious Surface, HSG A				
*		20,888	98	Porous Pav	Porous Pavement, HSG A			
		29,873	81	Weighted Average				
		8,411		28.16% Pervious Area				
		21,462		71.84% Impervious Area				
	Тс	Length	Slope	e Velocity	Capacity	Description		
_	(min)	(feet)	(ft/ft	(ft/sec)	(cfs)			
	6.0					Direct Entry.		

Subcatchment 1B: Area Draining to Parking Lot



Page 41

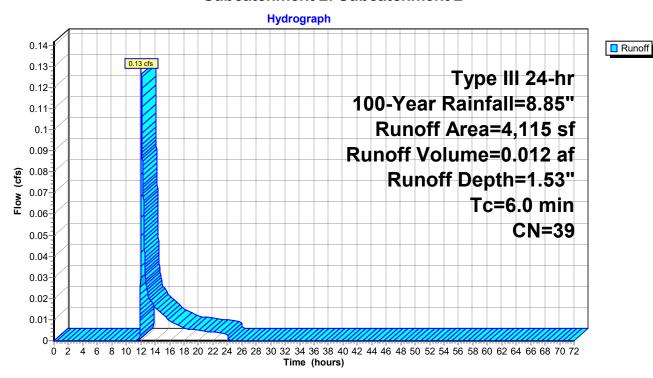
Summary for Subcatchment 2: Subcatchment 2

Runoff = 0.13 cfs @ 12.11 hrs, Volume= 0.012 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Type III 24-hr 100-Year Rainfall=8.85"

A	rea (sf)	CN E	Description				
	4,115	39 >	>75% Grass cover, Good, HSG A				
	4,115	1	100.00% Pervious Area				
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
6.0					Direct Entry,		

Subcatchment 2: Subcatchment 2



Printed 10/6/2020 Page 42

Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=514)

0.686 ac, 71.84% Impervious, Inflow Depth = 6.55" for 100-Year event Inflow Area = Inflow 5.13 cfs @ 12.09 hrs, Volume= 0.374 af 1.19 cfs @ 11.92 hrs, Volume= Outflow 0.374 af, Atten= 77%, Lag= 0.0 min Discarded = 1.19 cfs @ 11.92 hrs, Volume= 0.374 af

0.00 cfs @ 0.00 hrs. Volume= Primary 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs Peak Elev= 161.81' @ 12.48 hrs Surf.Area= 21,411 sf Storage= 3,521 cf Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 14.9 min (811.7 - 796.9)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
			17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#3	161.73'	23 cf	4.0" Round Pipe Storage Inside #1
			L= 258.0'

11,383 cf Total Available Storage

Elevation	Surf.Area	Inc.Store	Cum.Store
(feet)	(sq-ft)	(cubic-feet)	(cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

Surf.Area	Voids	Inc.Store	Cum.Store
(sq-ft)	(%)	(cubic-feet)	(cubic-feet)
21,411	0.0	0	0
21,411	40.0	2,141	2,141
21,411	30.0	2,120	4,261
	(sq-ft) 21,411 21,411	(sq-ft) (%) 21,411 0.0 21,411 40.0	(sq-ft) (%) (cubic-feet) 21,411 0.0 0 21,411 40.0 2,141

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	12.0" Round Culvert
	· ·		L= 20.0' CPP, mitered to conform to fill, Ke= 0.700
			Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	4.0" Vert. Orifice/Grate C= 0.600
#3	Discarded	161.40'	2.410 in/hr Exfiltration over Surface area

Discarded OutFlow Max=1.19 cfs @ 11.92 hrs HW=161.43' (Free Discharge) **T_3=Exfiltration** (Exfiltration Controls 1.19 cfs)

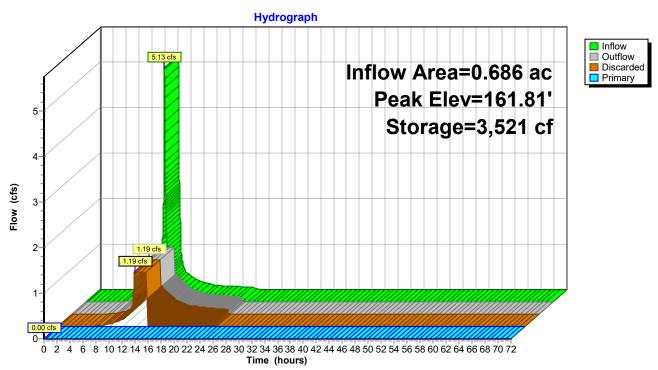
Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)

-1=Culvert (Controls 0.00 cfs)

²⁼Orifice/Grate (Controls 0.00 cfs)

Page 43

Pond P1: Porous Pavement



Page 44

2020.10.06 Proposed - Arlington Res

Prepared by Woodard Curran

HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Summary for Link DP-1: Reservoir and Swimming Area

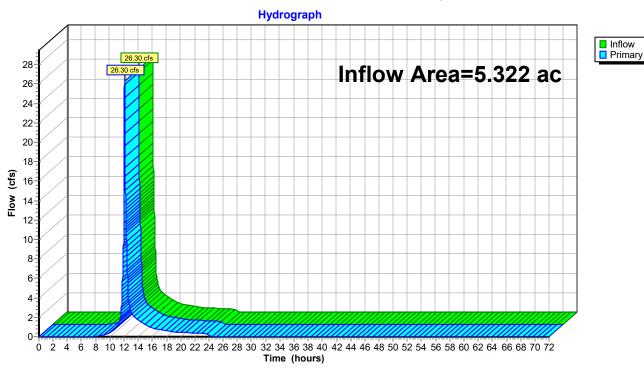
Inflow Area = 5.322 ac, 41.12% Impervious, Inflow Depth = 4.21" for 100-Year event

Inflow = 26.30 cfs @ 12.09 hrs, Volume= 1.868 af

Primary = 26.30 cfs @ 12.09 hrs, Volume= 1.868 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area



Prepared by Woodard Curran
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Page 45

Summary for Link DP-2: Ditch

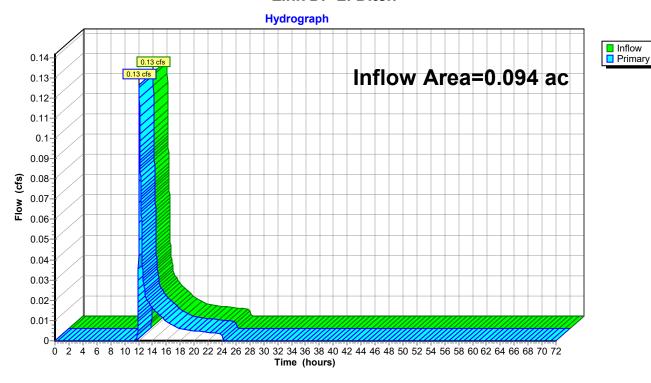
Inflow Area = 0.094 ac, 0.00% Impervious, Inflow Depth = 1.53" for 100-Year event

Inflow = 0.13 cfs @ 12.11 hrs, Volume= 0.012 af

Primary = 0.13 cfs @ 12.11 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch





APPENDIX E: OPERATIONS & MAINTENANCE PLAN

STORMWATER MANAGEMENT SYSTEM OPERATION & MAINTENANCE PLAN

This Stormwater Management System Operations & Maintenance Plan (the Plan) outlines measures that are essential for maintaining an effective stormwater management system at the Arlington Reservoir, located at 210 Lowell Street in Arlington, Massachusetts (the Site). Periodic and scheduled inspections and maintenance measures are recommended to prevent deficiencies and for proper performance of the stormwater management system. Failure to implement these measures can reduce the hydraulic capacity and the pollutant removal efficiency of stormwater measures resulting in a poor quality of stormwater runoff discharging from the Site.

RESPONSIBLE PARTY & ESTIMATED ANNUAL BUDGET

The party responsible for implementing this Plan and identifying the source of necessary funds is as follows:

Town of Arlington, Massachusetts – Department of Public Works 51 Grove Street Arlington, MA 02476 Telephone: (781) 316-3301

GOOD HOUSEKEEPING

The Site will be maintained as clean and orderly. Routine inspections of the Site for debris and sediment accumulations shall be performed. Debris and sediment shall be disposed of in accordance with local and State requirements.

INSPECTIONS & MAINTENANCE MEASURES

Stormwater management is provided by porous pavement sections, as illustrated on the Site Plans. Routine inspections and maintenance of the stormwater management system shall be performed in accordance with this Operation & Maintenance Plan. These measures are recommended to prevent deficiencies within the system that may result in poor quality of stormwater runoff.

A sample Inspection Form is attached and is recommended for use during inspections of the stormwater management system. The form includes a table that outlines specific inspection and maintenance measures, in addition to the following information that can be recorded by the inspector during the inspection. Completed Inspections Forms shall be kept at the Site to enable both Department of Public Works staff members and regulatory agencies to ensure that operation of the system is in compliance with this Operation & Maintenance Plan.

SOLID WASTE CONTAINMENT

Trash and recycling receptacles will be provided throughout the Site, as necessary. Receptacles should remain covered to prevent exposure with stormwater and to ensure waste will remain inside the receptacle. Waste collection must be performed regularly.

LANDSCAPE MANAGEMENT

Lawn and landscaped areas shall be inspected for patches of dead vegetation and erosion. If these conditions are observed, affected areas shall be stabilized and replanted with vegetation to prevent sediment from entering the stormwater management system.

The following measures shall be followed to minimize the potential for stormwater runoff pollution due to overwatering, dead vegetation and erosion, direct disposal of lawn clippings, and over-application of materials such as fertilizers and pesticides.

Lawn Mowing

The following mowing practices are recommended:

Maintain sharp mower blades.

- Typically, avoid cutting grass shorter than 2 to 3 inches in height, to minimize weed growth. Grass can be cut lower in the spring and fall to stimulate root growth but should not be cut shorter than 1½ inches.
- Do not dispose of grass clippings within the stormwater management system.
- Employ practices to minimize the potential for grass clippings to enter the stormwater management system.

Fertilizers & Pesticides

Use of pesticides and fertilizers should be minimized to the extent practicable. Application of these materials may degrade the quality of stormwater runoff and should therefore be applied cautiously. In addition, fertilizers and pesticides shall not be applied prior to rain events. These materials should be stored under cover to prevent their exposure to stormwater.

PERVIOUS AREA MANAGEMENT

Winter Operations

Remove accumulated snow after winter storm events to keep the site's parking lots open for operations and maintenance activities. Snow shall not be stored within pervious areas.

Plows with poly cutting blades are required for snow removal. With their use, no alterations to typical snow removal activities are required. Sand will prematurely clog the porous pavement system and should not be used for deicing. Magnesium Chloride is an alternative material that can be used for deicing, if necessary. Snow melts faster on porous pavement than traditional pavement, as melting water does not remain on the surface to insulate the remaining ice.

Pervious Pavement

The pervious pavement system shall be monitored for permeability and maintained with an industrial wet vacuum sweeper at east twice a year or more frequently, as needed. The frequency of cleanings will vary depending on Site conditions including frequency of traffic, local climate, and surrounding environment but should be performed once in the Spring and once in the Fall (after leaves have fallen but before the first snow fall) to assure the pavement's long function life.

Damage to the surface of the porous pavement can be repaired by using a concrete saw to remove the damaged area and installing new porous pavement in its place.

STORMWATER MANAGEMENT SYSTEM INSPECTION FORM

Town of Arlington, Massachusetts
Arlington Reservoir
210 Lowell Street
Arlington, MA 02474

Name of Inspector:			
Date/Time:			
Weather:			
Date of Last Inspection:			
Items Inspected (refer to Table	e 1 and provide additional s	heets if necessary):	
			_
	_		_
Commonto 8 Commontivo Antico	no Tokon (nyovido oddition)	al abanta if managamuli	
Comments & Corrective Action	ns Taken (provide additiona	ar sneets ir necessary):	
			—
			—

Table 1 – Operations & Maintenance Measures

Porous Pavement						
Objective: Maintain the infiltration and storage capacity of the porous pavement section.						
Frequency	Measure					
Ongoing/As Needed	 Monitor the surface of the porous pavement to proper drainage is achieved during storm events. 					
Quarterly	Remove sediment and organic debris on the porous pavement surface using a vacuum sweeper.					
Bi-Annually (once in Spring and once in Fall)	 Inspect the surface of the porous pavement for deterioration or clogging. Assess the infiltration capacity of the porous pavement sections. 					
Additional Comments	 Do not stockpile snow on porous pavement surface. This will require additional maintenance and vacuuming. Do not sand over porous pavement surface. 					

October 202**6**5 of 842



APPENDIX F: STORMWATER POLLUTION PREVENTION PLAN



APPENDIX G: MASSDEP CHECKLIST FOR STORMWATER REPORT



Massachusetts Department of Environmental Protection

Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.





A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals. This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

² For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

	ion presented in the Stormwater Checklist is accurate and that the information presented in the ater Report accurately reflects conditions at the site as of the date of this permit application.
Registe	red Professional Engineer Block and Signature
	Signature and Date
	Checklist
	Type: Is the application for new development, redevelopment, or a mix of new and opment?
☐ Nev	v development
⊠ Rec	levelopment
☐ Mix	of New Development and Redevelopment



Massachusetts Department of Environmental Protection Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

env	rironmentally sensitive design and LID Techniques were considered during the planning and design of project:			
	No disturbance to any Wetland Resource Areas			
	Site Design Practices (e.g. clustered development, reduced frontage setbacks)			
\boxtimes	Reduced Impervious Area (Redevelopment Only)			
\boxtimes	Minimizing disturbance to existing trees and shrubs			
	LID Site Design Credit Requested:			
	☐ Credit 1			
	☐ Credit 2			
	☐ Credit 3			
\boxtimes	Use of "country drainage" versus curb and gutter conveyance and pipe			
	Bioretention Cells (includes Rain Gardens)			
	Constructed Stormwater Wetlands (includes Gravel Wetlands designs)			
	Treebox Filter			
	Water Quality Swale			
	Grass Channel			
	Green Roof			
	Other (describe):			
Sta	ndard 1: No New Untreated Discharges			
\boxtimes	No new untreated discharges			
	Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth			
	Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.			



Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued) Standard 2: Peak Rate Attenuation Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding. Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm. Calculations provided to show that post-development peak discharge rates do not exceed predevelopment rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24hour storm. Standard 3: Recharge Soil Analysis provided. Required Recharge Volume calculation provided. Required Recharge volume reduced through use of the LID site Design Credits. Sizing the infiltration, BMPs is based on the following method: Check the method used. Static Simple Dynamic Dynamic Field¹ Runoff from all impervious areas at the site discharging to the infiltration BMP. Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume. Recharge BMPs have been sized to infiltrate the Required Recharge Volume. Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason: Site is comprised solely of C and D soils and/or bedrock at the land surface Solid Waste Landfill pursuant to 310 CMR 19.000 Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable. Calculations showing that the infiltration BMPs will drain in 72 hours are provided. Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Massachusetts Department of Environmental Protection Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Cł	necklist (continued)
Sta	andard 3: Recharge (continued)
	The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
	Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.
Sta	ndard 4: Water Quality
	B Long-Term Pollution Prevention Plan typically includes the following: Good housekeeping practices; Provisions for storing materials and waste products inside or under cover; Vehicle washing controls; Requirements for routine inspections and maintenance of stormwater BMPs; Spill prevention and response plans; Provisions for maintenance of lawns, gardens, and other landscaped areas; Requirements for storage and use of fertilizers, herbicides, and pesticides; Pet waste management provisions; Provisions for operation and management of septic systems; Provisions for solid waste management; Snow disposal and plowing plans relative to Wetland Resource Areas; Winter Road Salt and/or Sand Use and Storage restrictions; Street sweeping schedules; Provisions for prevention of illicit discharges to the stormwater management system; Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL; Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan; List of Emergency contacts for implementing Long-Term Pollution Prevention Plan. A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent. Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge: is within the Zone II or Interim Wellhead Protection Area is near or to other critical areas
	involves runoff from land uses with higher potential pollutant loads.
	The Required Water Quality Volume is reduced through use of the LID site Design Credits.
	Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Massachusetts Department of Environmental Protection Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Cł	necklist (continued)
Sta	andard 4: Water Quality (continued)
	The BMP is sized (and calculations provided) based on:
	☐ The ½" or 1" Water Quality Volume or
	☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
	The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
	A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.
Sta	ndard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)
	The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report. The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted <i>prior</i> to the discharge of stormwater to the post-construction stormwater BMPs.
\boxtimes	The NPDES Multi-Sector General Permit does <i>not</i> cover the land use.
	LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
	All exposure has been eliminated.
	All exposure has <i>not</i> been eliminated and all BMPs selected are on MassDEP LUHPPL list.
	The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.
Sta	ndard 6: Critical Areas
	The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
\boxtimes	Critical areas and BMPs are identified in the Stormwater Report.



Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

The project is subject to the Stormwater Management Standards only to the maximum Extent

Practicable as a:
☐ Limited Project
 Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area. Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
☐ Bike Path and/or Foot Path
□ Redevelopment Project
Redevelopment portion of mix of new and redevelopment.
Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report. The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued) Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued) The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has not been included in the Stormwater Report but will be submitted **before** land disturbance begins. ☐ The project is *not* covered by a NPDES Construction General Permit. The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report. ☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins. Standard 9: Operation and Maintenance Plan The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information: Name of the stormwater management system owners; Party responsible for operation and maintenance; Schedule for implementation of routine and non-routine maintenance tasks; ☐ Plan showing the location of all stormwater BMPs maintenance access areas; Description and delineation of public safety features; Estimated operation and maintenance budget; and Operation and Maintenance Log Form. The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions: A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs; A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions. Standard 10: Prohibition of Illicit Discharges ☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

NO Illicit Discharge Compliance Statement is attached but will be submitted *prior to* the discharge of

An Illicit Discharge Compliance Statement is attached;

any stormwater to post-construction BMPs.



woodardcurran.com commitment & integrity drive results



Town of Arlington, Massachusetts

Notice of Intent

Summary:

8:30pm

Deliberation

Notice of Intent: Department of Public Works, 51 Grove Street

MassDEP File #091-0326

This project proposes a new/renovated Municipal Facility to support the Department of Public Works (DPW), Inspectional Services Department (ISD), Facilities, and IT departments at 51 Grove Street. The proposed site includes the current 4.4-acre parcel, used by DPW / ISD, and an adjacent 1.4-acre portion of Town-owned land for a total of 5.8 acres. Sections of the site are within the 100-ft Wetlands Buffer, AURA, and 200-ft Riverfront Area of Mill Brook, as well as floodway and floodplain. This proposal was initially presented to the Commission at its 11/05/2020 meeting and was continued to 12/03/2020. The public hearing for this project was closed on 12/03/2020. During this meeting, the Commission will deliberate a permit for the

project.

ATTACHMENTS:

	Туре	File Name	Description
D	Notice of Intent	DPW_NOI_compressed.pdf	DPW NOI
D	Notice of Intent	DPW_NOI_Plans.pdf	DPW NOI Plans
D	Notice of Intent	DPW_NOI_Supplemental_Materials_11252020.pdf	DPW NOI Supplemental Materials 11252020
D	Reference Material	DRAFT_Arlington_DPW_Findings_and_Special_Conditions.pdf	Draft Order of Conditions_NEW



westonandsampson.com

55 Walkers Brook Drive, Suite 100 Reading, MA 01867 tel: 978.532.1900

Notice of Intent



October 2020

DPW FACILITY

PREPARED FOR: TOWN OF ARLINGTON

SUBMITTED TO: ARLINGTON CONSERVATION COMMISSION





55 Walkers Brook Drive, Suite 100, Reading, MA 01867 Tel: 978.532.1900

Arlington – DPW Facility WSE Project No. 2170997

October 22, 2020

Arlington Conservation Commission 730 Mass Ave. Annex Arlington, MA 02476;

Re: NOI Filing

DPW Facility 51 Grove Street

Dear Members of the Commission:

On behalf of the Town of Arlington, Weston & Sampson Engineers, Inc. is hereby enclosing seven (7) copies (including original) and an electronic copy of the Notice of Intent submittal (including plans) to fulfill the requirements of the Massachusetts Wetlands Protection Act, M.G.L. Chapter 131, Section 40 submittal requirements and the Town of Arlington submittal requirements. This submittal is a formal Notice of Intent for the upgraded DPW Facility at 51 Grove Street.

As part of the filing, we have attached the following:

Appendix A: Project Description
Appendix B: Alternatives Analysis
Appendix C: Stormwater Report
Appendix D: Project Maps

Appendix E: Project Specifications Appendix F: Abutters Information

Appendix G: Photos

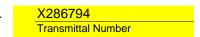
If you have any questions regarding this submittal, please contact me at (978) 532-1900.

Very truly yours,

WESTON & SAMPSON

Alexandra Gaspar Environmental Scientist

Enter your transmittal number



Your unique Transmittal Number can be accessed online: http://www.mass.gov/eea/agencies/massdep/service/approvals/transmittal-form-for-payment.html

Massachusetts Department of Environmental Protection Transmittal Form for Permit Application and Payment

1. Please type or print. A separate	A.	Permit Information					
Transmittal Form		WPA Form 3		Wetlands NOI			
must be completed		1. Permit Code: 4 to 7 character code from per	mit instructions	2. Name of Permit	Category		
for each permit		DPW Facility			5 ,		
application.		3. Type of Project or Activity					
2. Make your							
check payable to	R	Applicant Information - Firn	or Individua	al			
the Commonwealth	٥.	• •		41			
of Massachusetts		Arlington Department of Public Wor					
and mail it with a copy of this form to:		1. Name of Firm - Or, if party needing this ap	proval is an individu	al enter name below	:		
MassDEP, P.O.	•						
Box 4062, Boston,		2. Last Name of Individual	3. First	Name of Individual		4. MI	
MA 02211.		51 Grove Street					
3. Three copies of		5. Street Address		00.470	704 040 0404		
this form will be		Arlington	MA	02476	781-316-3101	10 =	
needed.		6. City/Town	7. State	8. Zip Code	9. Telephone #	10. Ext. #	
Copy 1 - the		Michael Rademacher			town.arlington.ma.us		
original must		11. Contact Person		12. e-mail address			
accompany your	_			_			
permit application. Copy 2 must	C.	Facility, Site or Individual Re	equiring App	roval			
accompany your		Arlngton DPW Facility					
fee payment.		1. Name of Facility, Site Or Individual					
Copy 3 should be		51 Grove Street					
retained for your		2. Street Address					
records		Arlington	MA	02476			
4. Both fee-paying and exempt		3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #	
applicants must mail a copy of this	8. DEP Facility Number (if Known) 9. Federal I.D. Number (if Known) 10. BWSC Tra				own) 10. BWSC Tracking	# (if Known)	
transmittal form to:	D.	Application Prepared by (if	different from	Section B)*			
MassDEP		Weston & Sampson Engineers					
P.O. Box 4062 Boston, MA		1. Name of Firm Or Individual					
02211		55 Walkers Brook Drive, Suite 100					
		2. Address				-	
		Reading	MA	01867	978-532-1900		
* Note:		3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #	
For BWSC Permits, enter the LSP.	,	Alexandra Gaspar					
onto: the 201 .		8. Contact Person		9. LSP Number (BV	VSC Permits only)		
	E. Permit - Project Coordination						
		-					
	1.	Is this project subject to MEPA review?					
		If yes, enter the project's EOEA file nun					
		Environmental Notification Form is subi	nitted to the MEPA				
	F	Amount Due		EOEA	File Number		
	г.	Amount Due					
DEP Use Only	Sp	ecial Provisions:					
	1.				or less).		
Permit No:	0	There are no fee exemptions for BWSC permits, regardless of applicant status.					
Decid C (2. 3.	☐ Hardship Request - payment extensions according to 310 CMR 4.04(3)(c). ☐ Alternative Schedule Project (according to 310 CMR 4.05 and 4.10)					
Rec'd Date:	3. 4.						
Reviewer:		, ,	-				
ACTIONOI.		Check Number	Dollar Amount		Date		
			- Juan Millouill		-410		

480 of 842

tr-formw • rev. 12/17 Page 1 of 1



Massachusetts Department of Environmental ProtectionBureau of Resource Protection - Wetlands

WPA Form 3 - Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

)	Provided by MassDEP:
	MassDEP File Number
	Document Transaction Number
	Arlington

City/Town

Important:

When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.





Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A.	General	Information	

51 Grove Street		Arlington	02476
a. Street Address		b. City/Town	c. Zip Code
Latitude and Longi	itude:	42deg25'10.953"N	71deg9'49.85"W
J		d. Latitude	e. Longitude
54-3-2.A f. Assessors Map/Plat N	Number	g. Parcel /Lot Number	
	vuilibei	g. i arcer/Lot Number	
Applicant:		Dadamaka	
Michael a. First Name		Rademacher b. Last Name	
	Manka	b. Last Name	
Director of Public \	Works		
c. Organization			
51 Grove Street			
d. Street Address		B 4.0	00.470
Arlington		MA	02476
e. City/Town		f. State	g. Zip Code
781-316-3101		mrademacher@town.arling	gton.ma.us
h. Phone Number	i. Fax Number	j. Email Address	
a. First Name		b. Last Name	
a. First Name c. Organization		b. Last Name	
		b. Last Name	
c. Organization		b. Last Name	g. Zip Code
c. Organization d. Street Address	i. Fax Number		g. Zip Code
c. Organization d. Street Address e. City/Town		f. State	g. Zip Code
c. Organization d. Street Address e. City/Town h. Phone Number Representative (if		f. State j. Email address	g. Zip Code
c. Organization d. Street Address e. City/Town h. Phone Number		f. State	g. Zip Code
c. Organization d. Street Address e. City/Town h. Phone Number Representative (if a Alexandra a. First Name	any):	f. State j. Email address Gaspar	g. Zip Code
c. Organization d. Street Address e. City/Town h. Phone Number Representative (if a	any):	f. State j. Email address Gaspar	g. Zip Code
c. Organization d. Street Address e. City/Town h. Phone Number Representative (if a Alexandra a. First Name Weston & Sampso c. Company	any): on Engineers	f. State j. Email address Gaspar	g. Zip Code
c. Organization d. Street Address e. City/Town h. Phone Number Representative (if a Alexandra a. First Name Weston & Sampso	any): on Engineers	f. State j. Email address Gaspar	g. Zip Code
c. Organization d. Street Address e. City/Town h. Phone Number Representative (if a Alexandra a. First Name Weston & Sampso c. Company 55 Walkers Brook d. Street Address	any): on Engineers	f. State j. Email address Gaspar b. Last Name	
c. Organization d. Street Address e. City/Town h. Phone Number Representative (if Alexandra a. First Name Weston & Sampso c. Company 55 Walkers Brook	any): on Engineers	f. State j. Email address Gaspar	g. Zip Code 01867 g. Zip Code
c. Organization d. Street Address e. City/Town h. Phone Number Representative (if a Alexandra a. First Name Weston & Sampso c. Company 55 Walkers Brook d. Street Address Reading e. City/Town	any): on Engineers	f. State j. Email address Gaspar b. Last Name MA f. State	01867
c. Organization d. Street Address e. City/Town h. Phone Number Representative (if a Alexandra a. First Name Weston & Sampso c. Company 55 Walkers Brook d. Street Address Reading	any): on Engineers	f. State j. Email address Gaspar b. Last Name	01867
c. Organization d. Street Address e. City/Town h. Phone Number Representative (if a Alexandra a. First Name Weston & Sampso c. Company 55 Walkers Brook d. Street Address Reading e. City/Town 978-532-1900 h. Phone Number	any): on Engineers Dr, Suite 100 i. Fax Number	f. State j. Email address Gaspar b. Last Name MA f. State gaspara@wseinc.com j. Email address	01867
c. Organization d. Street Address e. City/Town h. Phone Number Representative (if a Alexandra a. First Name Weston & Sampso c. Company 55 Walkers Brook d. Street Address Reading e. City/Town 978-532-1900 h. Phone Number	any): on Engineers Dr, Suite 100	f. State j. Email address Gaspar b. Last Name MA f. State gaspara@wseinc.com j. Email address	01867



Massachusetts Department of Environmental ProtectionBureau of Resource Protection - Wetlands

WPA Form 3 - Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

rov	ided by MassDEP:
	MassDEP File Number
	Document Transaction Number
	Arlington
	City/Town

A. General Information (continued)6. General Project Description:

	Upgrades to the Arlington DPW		
7a.	Project Type Checklist: (Limited Project Types see	Section A. 7b.)	
	1. Single Family Home	2. Residential Subdivision	
	3. Commercial/Industrial	4. Dock/Pier	
	5. Utilities	6. Coastal engineering Structure	
	7. Agriculture (e.g., cranberries, forestry)	8. Transportation	
	9. 🛛 Other		
7b.			
	2. Limited Project Type If the proposed activity is eligible to be treated as ar CMR10.24(8), 310 CMR 10.53(4)), complete and at Charles and Contiferation.		
8.	Project Checklist and Signed Certification. Property recorded at the Registry of Deeds for:		
	Middlesex		
	a. County	b. Certificate # (if registered land)	
	9705	6	
_	c. Book	d. Page Number	
В.	Buffer Zone & Resource Area Impa	acts (temporary & permanent)	

- 1. Buffer Zone Only Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
- 2. Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.



For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Massachusetts Department of Environmental ProtectionBureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

rov	rided by MassDEP:
	MassDEP File Number
	Document Transaction Number
	Arlington
	City/Town

B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)		
a. 🗌 Bank	1. linear feet	2. linear feet		
b. Bordering Vegetated Wetland	1. square feet	2. square feet		
c. Land Under Waterbodies and	1. square feet	2. square feet		
Waterways	3. cubic yards dredged			
Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)		
d. 🛛 Bordering Land	3,725	3,725		
Subject to Flooding	 square feet 	2. square feet		
	3. cubic feet of flood storage lost	4. cubic feet replaced		
e. Isolated Land Subject to Flooding	1. square feet			
	2. cubic feet of flood storage lost	3. cubic feet replaced		
f. X Riverfront Area	Mill Brook			
Z	Name of Waterway (if available) - spe	cify coastal or inland		
2. Width of Riverfront Area ((check one):			
25 ft Designated Densely Developed Areas only				
☐ 100 ft New agricultural projects only				
a Tatal area of Divertrent Are	a an the gite of the proposed project	30,417		
3. Total area of Riveriront Are	a on the site of the proposed project	square feet		
4. Proposed alteration of the F	Riverfront Area:			
30,417	16,973	13,444		
a. total square feet	b. square feet within 100 ft.	c. square feet between 100 ft. and 200 ft.		
5. Has an alternatives analysi	s been done and is it attached to th	is NOI? ⊠ Yes ☐ No		
6. Was the lot where the activ	ity is proposed created prior to Aug	ust 1, 1996? ⊠ Yes □ No		
3. Coastal Resource Areas: (See	310 CMR 10.25-10.35)			

Note: for coastal riverfront areas, please complete **Section B.2.f**. above.



Massachusetts Department of Environmental ProtectionBureau of Resource Protection - Wetlands

WPA Form 3 - Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

rov	ided by MassDEP:
	MassDEP File Number
	Document Transaction Number
	Arlington
	City/Town

B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users:
Include your
document
transaction
number
(provided on your
receipt page)
with all
supplementary
information you
submit to the
Department.

Resource Area		Size of Proposed	d Alteration	Proposed Replacement (if any)
а. 🗌	Designated Port Areas	Indicate size under Land Under the Ocean, below		
b. 🗌	Land Under the Ocean	1. square feet		
		2. cubic yards dredg	ed	
с. 🗌	Barrier Beach	Indicate size und	der Coastal Beac	ches and/or Coastal Dunes below
d. 🗌	Coastal Beaches	1. square feet		2. cubic yards beach nourishment
е. 🗌	Coastal Dunes	1. square feet		2. cubic yards dune nourishment
		Size of Propose	d Alteration	Proposed Replacement (if any)
f.	Coastal Banks	1. linear feet		
g. 🗌	Rocky Intertidal Shores	1. square feet		
h. 🗌	Salt Marshes	1. square feet		2. sq ft restoration, rehab., creation
i. 🗌	Land Under Salt Ponds	1. square feet		
		2. cubic yards dredg	ed	
j. 🗌	Land Containing Shellfish	1. square feet		
k. 🗌	Fish Runs			ss, inland Bank, Land Under the r Waterbodies and Waterways,
		1. cubic yards dredg	ed	
I	Land Subject to Coastal Storm Flowage	1. square feet		
Restoration/Enhancement If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.				
a. square feet of BVW			b. square feet of Sa	alt Marsh
☐ Pro	oject Involves Stream Cros	sings		
a. number of new stream crossings			b. number of replace	cement stream crossings

484 of 842

4.

5.



Massachusetts Department of Environmental ProtectionBureau of Resource Protection - Wetlands

WPA Form 3 - Notice of Intent

Provided by MassDEP:
MassDEP File Number
Document Transaction Number
Arlington
City/Town

VIE	assachusetts Wetlands Protection Act M.G.	.L. c. 131, §40	Arlington City/Town	
C.	Other Applicable Standards and F	Requirements	C.y, re	
	This is a proposal for an Ecological Restoration complete Appendix A: Ecological Restoration (310 CMR 10.11). reamlined Massachusetts Endangered Spec	on Limited Project. Limited Project Ch	ecklists – Required Actions	
1.	Is any portion of the proposed project located in E : the most recent Estimated Habitat Map of State-Li Natural Heritage and Endangered Species Progra Massachusetts Natural Heritage Atlas or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/v	isted Rare Wetland W m (NHESP)? To view	/ildlife published by the	
	a. Yes No If yes, include proof of n	nailing or hand deliv	very of NOI to:	
	Natural Heritage and E Division of Fisheries a 1 Rabbit Hill Road Westborough, MA 015	nd Wildlife	rogram	
	If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); OR complete Section C.2.f, if applicable. If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).			
	c. Submit Supplemental Information for Endangere	ed Species Review*		
	Percentage/acreage of property to be a	altered:		
	(a) within wetland Resource Area	percentage/acreage		
	(b) outside Resource Area	percentage/acreage		
	2. Assessor's Map or right-of-way plan o	f site		
2.	Project plans for entire project site, including v wetlands jurisdiction, showing existing and propos tree/vegetation clearing line, and clearly demarcat	ed conditions, existin		
	(a) Project description (including description buffer zone)	ion of impacts outside	e of wetland resource area &	
	(b) Photographs representative of the site	9		

wpaform3.doc • rev. 6/18/2020 Page 5 of 9

^{*} Some projects not in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see https://www.mass.gov/maendangered-species-act-mesa-regulatory-review).

Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

^{**} MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.

485 of 842 not required as part of the Notice of Intent process.



Massachusetts Department of Environmental Protection Bureau of Resource Protection - Wetlands WPA Form 3 - Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:			
	,		
	MassDEP File Number		
	Document Transaction Number		
	Arlington		
	City/Town		

D. Additional Information (cont'd)

U.	. Auu	itional information (conta)			
	3. A Identify the method for BVW and other resource area boundary delineations (MassDEP BV Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc and attach documentation of the methodology.				
	4. 🛛	List the titles and dates for all plans and other	er materials submitted with	this NOI.	
		ington Town Yard Facility			
		lan Title ston & Sampson Engineers	Laurence F. Keegan,	lr DE	
		repared By	c. Signed and Stamped by	л, г 🗅	
		0/22/2020	1"=30'		
	d. F	inal Revision Date	e. Scale		
	f. Ad	dditional Plan or Document Title		g. Date	
	5.	If there is more than one property owner, ple listed on this form.	ease attach a list of these p	property owners not	
	6.	Attach proof of mailing for Natural Heritage	and Endangered Species F	Program, if needed.	
	7.	Attach proof of mailing for Massachusetts D	ivision of Marine Fisheries	, if needed.	
	8. 🔀	Attach NOI Wetland Fee Transmittal Form			
	9. 🛛	Attach Stormwater Report, if needed.			
Ē.	Fees				
	1.	Fee Exempt: No filing fee shall be assessed of the Commonwealth, federally recognized authority, or the Massachusetts Bay Transp	Indian tribe housing autho		
	Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:			of the NOI Wetland	
	2. Munici	pal Check Number	3. Check date		
	4. State 0	Check Number	5. Check date		

7. Payor name on check: Last Name

6. Payor name on check: First Name



Massachusetts Department of Environmental ProtectionBureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
MassDEP File Number
Document Transaction Number
Arlington
City/Town

C. Other Applicable Standards and Requirements (cont'd)

(c)		ole at https://www.mass.gov/how-to/how-to-file-for-	
Make	a-mesa-project-review). Make check payable to "Commonwealth of Massachusetts - NHESP" and <i>mail to NHESP</i> at above address		
Project	ts altering 10 or more acres of land, also sub	mit:	
(d)	Vegetation cover type map of site		
(e)	Project plans showing Priority & Estima	ated Habitat boundaries	
(f) Ol	R Check One of the Following		
1. Project is exempt from MESA review. Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, https://www.mass.gov/service-details/exemptions-from-review-for-projectsactivities-in-priority-habitat ; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)			
2. 🗌	Separate MESA review ongoing.	a. NHESP Tracking # b. Date submitted to NHESP	
3.	Separate MESA review completed. Include copy of NHESP "no Take" dete Permit with approved plan.	rmination or valid Conservation & Management	
For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?			
a. Not applicable – project is in inland resource area only b. Yes No			
If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:			
South Shore - Cohasset to Rhode Island border, and horth Shore - Hull to New Hampshire border: the Cape & Islands:			
Division of Marine Fisheries - Southeast Marine Fisheries Station Attn: Environmental Reviewer 836 South Rodney French Blvd. New Bedford, MA 02744 Email: dmf.envreview-south@mass.gov Division of Marine Fisheries - North Shore Office Attn: Environmental Reviewer 30 Emerson Avenue Gloucester, MA 01930 Email: dmf.envreview-north@mass.gov			
Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.			
c. 🗌 🛮 Is	this an aquaculture project?	d. 🗌 Yes 🔲 No	
If yes, incl	ude a copy of the Division of Marine Fish	eries Certification Letter (M.G.L. c. 130, § 57).	

3.



Massachusetts Department of Environmental Protection Bureau of Resource Protection - Wetlands

WPA Form 3 - Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:		
-	MassDEP File Number	
-	Document Transaction Number	
	Arlington	
-	City/Town	

C. Other Applicable Standards and Requirements (cont'd)

	4.	Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?		
Online Users: Include your document		a. \square Yes \boxtimes No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). Note: electronic filers click on Website.		
transaction number		b. ACEC		
(provided on your receipt page) with all	5.	Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?		
supplementary		a. Yes No		
information you submit to the Department.	6.	Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?		
		a. Yes No		
	7.	Is this project subject to provisions of the MassDEP Stormwater Management Standards?		
		 a. Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if: 1. Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3) 		
		2. A portion of the site constitutes redevelopment		
		3. Proprietary BMPs are included in the Stormwater Management System.		
		3. Trophetary bines are included in the Stoffiwater Management System.		
		b. No. Check why the project is exempt:		
		1. Single-family house		
		2. Emergency road repair		
		3. Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.		
	D.	Additional Information		
		This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).		
		Applicants must include the following with this Notice of Intent (NOI). See instructions for details.		
		Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.		
		1. 🗵 USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)		

Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative

to the boundaries of each affected resource area.

488 of 842

2.



Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

1	Provided by MassDEP:
	MassDEP File Number
	Document Transaction Number

City/Town

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

	10/21/2020
1. Signature of Applicant	2. Date
3. Signature of Property Owner (if different)	4. Date
ago-	10/21/2020
5. Signature of Representative (if any)	6. Date

For Conservation Commission:

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:

If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.



Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.





Α.	Applicant Inf	ormation					
1.	Location of Project:						
	51 Grove Street		Arlington				
	a. Street Address		b. City/Town				
	exempt						
	c. Check number		d. Fee amount				
2.	Applicant Mailing A	ddress:					
	Michael		Rademacher, P.E				
	a. First Name		b. Last Name				
	Director of Public W	/orks					
	c. Organization						
	51 Grove Street						
	d. Mailing Address						
	Arlington		MA	02476			
	e. City/Town		f. State	g. Zip Code			
	781-316-3101		mrademacher@town.arli	ngton.ma.us			
	h. Phone Number	i. Fax Number	j. Email Address				
3.	Property Owner (if	different):					
	a. First Name		b. Last Name				
	c. Organization						
	d. Mailing Address						
	e. City/Town		f. State	g. Zip Code			
	h. Phone Number	i. Fax Number	i. Email Address				

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

B. Fees

Fee should be calculated using the following process & worksheet. *Please see Instructions before filling out worksheet.*

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract \$12.50. To calculate the city/town share of the fee, divide the total fee in half and add \$12.50.



Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Fees (continued)			
Step 1/Type of Activ	rity Step 2/Nun of Activiti		Step 4/Subtotal Activity Fee
EXEMPT			EXEMPT
			_
			_
			_
	Ste	ep 5/Total Project Fee	: EXEMPT
	S	Step 6/Fee Payments:	
		Total Project Fee:	a. Total Fee from Step 5
	State	share of filing Fee:	b. 1/2 Total Fee less \$ 12.50
	City/Town	n share of filling Fee:	c. 1/2 Total Fee plus \$12.50

C. Submittal Requirements

a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection Box 4062 Boston, MA 02211

b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

Appendix A

PROJECT DESCRIPTION

Background

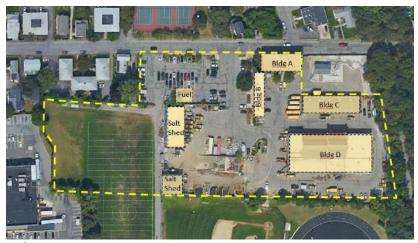
The Town of Arlington is proposing a new Project to support the Department of Public Works and other Town operations. The existing buildings are outdated, undersized, and contain many code deficiencies and inefficiencies to properly support operations. The Project is part of the site's Master Plan for a Town Wide Campus, including the High School, Public Works, Inspectional Services Department (ISD), Facilities, and Information Technology (IT). The High School project has recently been permitted. This Permit Application is for the remaining aspects of the Master Plan.

The new project is located at the existing Public Works site, 51 Grove Street. The new facility is sized to properly accommodate modern Public Works operations, ISD, Facilities, and IT. The project includes Renovation of four existing buildings, construction of one new building, site improvements, and construction of ancillary support features.

Site Description

The Project site is located on Grove Street, immediately northwest of the High School. It is bound easterly by a National Grid natural gas facility and the Minuteman Commuter Bike Way. Westerly of the property are residences and a grocery store. North of the property,

across Grove street, are residences and tennis There are six courts. existing buildings on the Public Works site. The Public Works property is approximately 5.8 acres and is predominately paved. The area that is currently being used as a field to the southwest of the buildings, constructed over an



area of contaminated soil and

has an impermeable cap just beneath the surface, essentially rending the field area impervious as well. Site grades are generally flat.

Running North to south through the property is Mill Brook. From the property line at Grove Street, the Brook runs in a stone lined channel for approximately 37 feet, before entering a culvert. This channel is a regulatory floodway per FEMA mapping. From the end of the stone channel, the Brook enters a culvert. The culvert daylights at two locations on the property. Each of these openings and the area surrounding them are part of the 100-year flood zone per FEMA mapping.





Riverfront areas and wetland buffer zones extend from the stone lined channel and from the culvert openings. These resources area buffer zones are predominately impervious with approximately 2,000 square feet of vegetated areas (<12% of the buffer zone) consisting of mainly non-native species.

Scope of Work

The Project involves the renovation of four buildings and the construction of one new building, plus the replacement of operations support features such as the fuel island and the salt shed. As part of this effort, two of the existing salt shed buildings will be demolished. The new nearly 30,000 square foot building will include interior vehicle storage, office space, maintenance bays, vehicle washing, and other operational support features. A new salt shed will also be constructed. The salt shed will allow for delivery vehicles to dump salt directly in the building; thereby minimizing cleanup and remnants exterior to the building.

Work within the riverfront area and the 100-foot wetland buffer zone include site improvements and minor grade changes. A portion of the new building will also lie within these areas. There will be a reduction in impervious surfaces within these areas.

The stormwater design report is included as Appendix C. Site stormwater improvements include:

- Catch basins will be replaced with deep sump hooded catch basins
- Three (3) Hydrodynamic separators will be installed
- An underground chamber detention system will be installed to control peak flows.

In addition to the improved stormwater features, the Project includes the following additional features to improve the overall integrity of stormwater and the environment:

- Improved storage of vehicles, equipment and materials (maximize indoor vs. outdoor)
- Improved storage and handling of liquid petroleum products
- Improved vehicle washing operations (no discharge to stormwater system)

Landscape areas will be planted with native species.

Environmental Considerations

Before ground disturbance activities commence, erosion control BMPs will be installed, including compost filter tubes with silt fence and strawbales will be used around the stream openings, and inlet protection around existing structures. Please see Appendix C for the project's Construction Period Pollution and Erosion and Sedimentation Control Plan, located in Attachment G of the stormwater report.

Several resource areas protected by both the Arlington Conservation Commission Bylaw and the Massachusetts Wetlands Protection Act will be impacted as part of this project.

This includes 200' Riverfront Area and Bordering Land Subject to Flooding. Areas impacted that are protected by the Town of Arlington include the boundaries of 25-ft, 50-ft, 75-ft, and 100-ft from the resource area (Top of Bank of Mill Creek).

Riverfront Area

Since Mill Brook is considered a perennial stream, a 200-foot Riverfront Area is associated with it. While Mill Brook flows through the entirety of the site, only the 3 daylighted areas have riverfront associated with them. There will be 16,973 sf of impact to the 0-100' riverfront, and 13,444 sf of impact to the 100'-200' riverfront. These impacts are to accommodate general site improvements, and minor grade changes. The area where work will occur (51 Grove Street) is considered already altered area (primarily paved area). As such, since the limit of work is fully within the riverfront area, work at this site is considered re-development work in riverfront area. Each standard for work in riverfront for redevelopment projects area (per 310 CMR 10.58 (5)) are provided below, followed by an explanation on how the project meets each standard.

(a) At a minimum, proposed work shall result in an improvement over existing conditions of the capacity of the riverfront area to protect the interests identified in M.G.L. c. 131 § 40.

Because work will involve the planting of native species, this project will result in an improvement over existing conditions of the capacity of the riverfront area to protect the interests identified in M.G.L. c. 131 § 40.

(b) Stormwater management is provided according to standards established by the Department.

Per Appendix C of the Notice of Intent, this project will adhere to the stormwater standards established by the Department.

(c) Within 200 foot riverfront areas, proposed work shall not be located closer to the river than existing conditions or 100 feet, whichever is less, or not closer than existing conditions within 25 foot riverfront areas, except in accordance with 310 CMR 10.58(5)(f) or (g).

The work in the riverfront area will all be within already altered area (pavement and existing structure). The project will provide improved habitat with a variety of native species being planted at the site.

(d) Proposed work, including expansion of existing structures, shall be located outside the riverfront area or toward the riverfront area boundary and away from the river, except in accordance with 310 CMR 10.58(5)(f) or (g).

Work will not be outside the riverfront area or toward the riverfront area boundary, however the work will be in accordance with 310 CMR 10.58(5)(f) as much of the work is within a degraded riverfront area (pavement, which does not provide optimal riverfront area habitat).

(e) The area of proposed work shall not exceed the amount of degraded area, provided that the proposed work may alter up to 10% if the degraded area is less than 10% of the riverfront area, except in accordance with 310 CMR 10.58(5)(f) or (g).

The area of proposed work within the riverfront area is 30, 417 sf. Total riverfront area on the parcel is 30,417 sf. Thus, 100 percent of the site's riverfront area will be altered. The work will be in accordance with 310 CMR 10.58(5)(f) as all of the work is within a degraded riverfront area consisting of pavement and existing structure.

- (f) When an applicant proposes restoration on-site of degraded riverfront area, alteration may be allowed notwithstanding the criteria of 310 CMR 10.58(5)(c), (d), and (e) at a ratio in square feet of at least 1:1 of restored area to area of alteration not conforming to the criteria. Areas immediately along the river shall be selected for restoration. Alteration not conforming to the criteria shall begin at the riverfront area boundary. Restoration shall include:
- 1. removal of all debris, but retaining any trees or other mature vegetation;
- 2. grading to a topography which reduces runoff and increases infiltration;
- 3. coverage by topsoil at a depth consistent with natural conditions at the site; and
- 4. seeding and planting with an erosion control seed mixture, followed by plantings of herbaceous and woody species appropriate to the site;

Restoration efforts will include the creation of pervious area in the form of native plantings.

(g) When an applicant proposes mitigation either on-site or in the riverfront area within the same general area of the river basin, alteration may be allowed notwithstanding the criteria of 310 CMR 10.58(5)(c), (d), or (e) at a ratio in square feet of at least 2:1 of mitigation area to area of alteration not conforming to the criteria or an equivalent level of environmental protection where square footage is not a relevant measure. Alteration not conforming to the criteria shall begin at the riverfront area boundary. Mitigation may include off-site restoration of riverfront areas, conservation restrictions under M.G.L. c. 184, §§ 31 through 33 to preserve undisturbed riverfront areas that could be otherwise altered under 310 CMR 10.00, the purchase of development rights within the riverfront area, the restoration of bordering vegetated wetland, projects to remedy an existing adverse impact on the interests identified in M.G.L. c. 131, § 40 for which the applicant is not legally responsible, or similar activities undertaken voluntarily by the applicant which will support a determination by the issuing authority of no significant adverse impact. Preference shall be given to potential mitigation projects, if any, identified in a River Basin Plan approved by the Secretary of the Executive Office of Energy and Environmental Affairs.

Not applicable.

(h) The issuing authority shall include a continuing condition in the Certificate of Compliance for projects under 310 CMR 10.58(5)(f) or (g) prohibiting further alteration within the restoration or mitigation area, except as may be required to maintain the area in its restored or mitigated condition. Prior to requesting the issuance of the Certificate of Compliance, the applicant shall demonstrate the restoration or mitigation has been successfully completed for at least two growing seasons.

Per Arlington conservation commission requirements, the area will be monitored for three years to ensure success of planting areas.

Bordering Land Subject to Flooding

There will be approximately 3,725 sf of temporary impact to BLSF as part of this project. The performance standards associated with BLSF are addressed below.

 a. Compensatory storage shall be provided for all flood storage volume that will be lost as the result of a proposed project within Bordering Land Subject to Flooding,

There will be no regrading in BLSF as part of this project, therefore there will be no change in flood storage. It is for this reason that no compensatory storage is provided.

b. Work within Bordering Land Subject to Flooding, including that work required to provide the above-specified compensatory storage, shall not restrict flows so as to cause an increase in flood stage or velocity.

There will be no restriction of flows or increase in flood stage or velocity as part of this project.

c. Work in those portions of bordering land subject to flooding found to be significant to the protection of wildlife habitat shall not impair its capacity to provide important wildlife habitat functions. Except for work which would adversely affect vernal pool habitat, a project or projects on a single lot, for which Notice(s) of Intent is filed on or after November 1, 1987, that (cumulatively) alter(s) up to 10% or 5,000 square feet (whichever is less) of land in this resource area found to be significant to the protection of wildlife habitat, shall not be deemed to impair its capacity to provide important wildlife habitat functions. Additional alterations beyond the above threshold, or altering vernal pool habitat, may be permitted if they will have no adverse effects on wildlife habitat, as determined by procedures contained in 310 CMR 10.60.

This project is occurring in already altered area that consists mostly of impervious surface (pavement, etc). As such, there is no existing wildlife habitat within the BLSF that would be altered.

d. Protection of Rare Wildlife Species. Notwithstanding the provisions of 310 CMR 10.57(4)(a) or (b), no project may be permitted which will have any adverse effect on specified wildlife habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59.

As stated above, the work in the BLSF is already altered area consisting of mostly impervious surface. There are also no mapped endangered species at the site. It is for these reasons that no impact to Rare Wildlife Species or their habitat is anticipated.

Appendix B

Alternatives Analysis

Basis for Alternatives Analysis

The following is an analysis of alternatives developed for a new Public Works (DPW) Facility to address deficiencies at the existing site, located at 51 Grove Street. The primary objective of the project is to provide a properly sized, safe, efficient, and code compliant facility for staff while also improving current stormwater management systems on site.

Alternative Analysis

Weston & Sampson has been working with the Town since 2017 to identify potential options for a new DPW facility. The first step in identifying potential options was to complete a programming analysis determining the minimum building and site components needed to support the operations. Concepts were developed to evaluate the ability of the site to safely and efficiently support operations.

Site Alternatives

Utilizing the programming analysis for the operations, multiple site layout alternatives were developed. One of the goals of the project was to develop a facility that could house a majority of the DPW vehicles and equipment indoors reducing the need to store the equipment outdoors as is currently done. This approach will not only improve safety and efficiency at the DPW, it will also protect the environment by placing vehicles and equipment indoors where any drips or runoff from the vehicles and equipment will be collected and discharged to the sanitary sewer system in lieu of the stormwater system. The option to do nothing was not deemed viable from an operational perspective as well as a stormwater perspective. The current facility conditions pose a health and safety risk to staff and contribute to operational inefficiencies at the site due to the age and condition of the facilities (some approaching 100 years old). Furthermore, a do-nothing option would not allow the Town to address the old / outdated stormwater system which discharges untreated / minimally treated stormwater to Mill Brook.

A total of five alternatives were further considered. In each of the options, the difference in the amount of impervious area within the wetland buffer zone and the riverfront area differed only slightly, and each of the options also considers the same stormwater improvements. Due to historic contamination and current MassDEP regulations related to the closure status of the site, the existing impervious areas cannot be eliminated and improved within the riverfront area since these impervious surfaces represent a MassDEP approved direct contact barrier. A summary of the alternatives and each of their potential stormwater quality impact considerations is as follows:

- Option 1 This alternative consisted of a 3-story administrative building. Under this
 layout, the culvert opening in the middle of the site would be closed off, paved over,
 and the new fuel island and salt shed would be constructed within its wetland buffer
 zone and river front area.
- Option 2 This alternative consisted of a central campus style concept. Under this
 alternative, the culvert opening in the middle of the site would be closed off and

- paved over for additional parking. Additionally, the fuel island and the salt shed loading ramp would be constructed within the wetland buffer zone.
- Option 3 This is another campus style layout, similar to Option 2. Under this
 layout, the culvert opening in the middle of the site would be closed off and paved
 over to accommodate bulk material storage above the brook.
- Option 4 This option was used to develop the current site layout. This option
 consolidates the operations to the upper portion of the site. This site moves the
 salt shed and the fuel island to be away from the wetland buffer zone and the
 riverfront area. This option was further refined to the current layout, included with
 the application, to minimize the impact of the bulk material storage.
- Option 5 This option is a variation of Option 4; however, a portion of the salt shed
 is located within the wetland buffer zone. This layout also has an expanded
 pavement area located outside of the wetland buffer zone.

Conclusion

Several operational and regulatory impacts were considered when analyzing these options. The options listed above which involved paving over the opening to the culvert were deemed not viable from a regulatory perspective since this opening is part of the riverfront area. Furthermore, any change to the size or shape of the culvert openings is not viable due to alternations to the stream hydraulics which could create upstream impacts based on previous studies of the stream corridor. Each of the five options include the use of the adjacent town owned field area. Initial analyses of the DPW site determined that the facility could not be upgraded to meet current codes and safety standards without expanding into this field area. It should be noted that the field area is outside of the 200' riverfront area and although it has a pervious surface, a majority of the field has an existing impervious membrane layer constructed below the surface of the field providing a cap to underlying historic contamination. The stormwater system being provided for the site, including the field area, has been designed to meet current stormwater regulations and will provided for properly treated stormwater accordingly.

Based on the Alternatives Analysis, Weston & Sampson is recommending that Alternative 4 (with the minor modifications as shown in the NOI application) be the option that the Town of Arlington pursues to provide a properly sized, safe, efficient, and environmentally conscientious facility for the Department of Public Works and associated Town Departments. This option reduces the threat of greater impacts resulting from the fueling and salt operations. In addition, the existing pervious areas around the culvert openings are being improved to the maximum extent practicable by removing invasive species and historic surface sedimentation and improving the area with new native plantings and stormwater system to reduce untreated runoff from entering the riverfront area.











Appendix C



westonandsampson.com

100 Foxborough Boulevard, Suite 250 Foxborough, MA 02035 tel: 508.698.3034

STORMWATER REPORT

October 2020

TOWN OF

Arlington MASSACHUSETTS

Department of Public Works 51 Grove Street

TABLE OF CONTENTS

CHECKLIST FOR STORMWATER REPORT STORMWATER REPORT SUMMARY

APPENDIX A – LOCUS MAP

AREA RECEPTORS MAP

FEMA FLOOD HAZARD MAP

NRCS SOIL MAP & DESCRIPTION

APPENDIX B – PRE- VS. POST-FLOW SUMMARY
PRE- VS. POST-VOLUME SUMMARY
EXISTING HYDROCAD MODEL
PROPOSED HYDROCAD MODEL

APPENDIX C – WATER QUALITY RATE CALCULATION
TSS REMOVAL WORKSHEET

APPENDIX D – LONG TERM POLLUTION PREVENTION PLAN

CONSTRUCTION PERIOD POLLUTION AND EROSION AND SEDIMENTATION CONTROL PLAN

ILLICIT DISCHARGE COMPLIANCE STATEMENT

OPERATIONS AND MAINTENANCE PL



Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.





A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals. This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

03_Arlington Checklist.doc • 04/01/08

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

² For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Signature and Date 10.22.20

Checklist

	eject Type: Is the application for new development, redevelopment, or a mix of new and evelopment?
	New development
	Redevelopment
\boxtimes	Mix of New Development and Redevelopment



Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

	No disturbance to any Wetland Resource Areas
	Site Design Practices (e.g. clustered development, reduced frontage setbacks)
	Reduced Impervious Area (Redevelopment Only)
	Minimizing disturbance to existing trees and shrubs
	LID Site Design Credit Requested:
	Credit 1
	☐ Credit 2
	☐ Credit 3
	Use of "country drainage" versus curb and gutter conveyance and pipe
\boxtimes	Bioretention Cells (includes Rain Gardens)
	Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
	Treebox Filter
	Water Quality Swale
	Grass Channel
	Green Roof
	Other (describe):
Sta	ndard 1: No New Untreated Discharges
\boxtimes	No new untreated discharges
	Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
	Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued) Standard 2: Peak Rate Attenuation Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding. Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm. Calculations provided to show that post-development peak discharge rates do not exceed predevelopment rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24hour storm. Standard 3: Recharge Soil Analysis provided. Required Recharge Volume calculation provided. Required Recharge volume reduced through use of the LID site Design Credits. Sizing the infiltration, BMPs is based on the following method: Check the method used. Static Simple Dynamic Dynamic Field¹ Runoff from all impervious areas at the site discharging to the infiltration BMP. Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume. Recharge BMPs have been sized to infiltrate the Required Recharge Volume. Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason: Site is comprised solely of C and D soils and/or bedrock at the land surface M.G.L. c. 21E sites pursuant to 310 CMR 40.0000 Solid Waste Landfill pursuant to 310 CMR 19.000 Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable. Calculations showing that the infiltration BMPs will drain in 72 hours are provided. Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Cr	necklist (continued)
Sta	ndard 3: Recharge (continued)
	The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
	Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.
Sta	ndard 4: Water Quality
	E Long-Term Pollution Prevention Plan typically includes the following: Good housekeeping practices; Provisions for storing materials and waste products inside or under cover; Vehicle washing controls; Requirements for routine inspections and maintenance of stormwater BMPs; Spill prevention and response plans; Provisions for maintenance of lawns, gardens, and other landscaped areas; Requirements for storage and use of fertilizers, herbicides, and pesticides; Pet waste management provisions; Provisions for operation and management of septic systems; Provisions for solid waste management; Snow disposal and plowing plans relative to Wetland Resource Areas; Winter Road Salt and/or Sand Use and Storage restrictions; Street sweeping schedules; Provisions for prevention of illicit discharges to the stormwater management system; Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL; Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan; List of Emergency contacts for implementing Long-Term Pollution Prevention Plan. A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
\bowtie	Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
	is within the Zone II or Interim Wellhead Protection Area
	is near or to other critical areas
	is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
	involves runoff from land uses with higher potential pollutant loads.
	The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if

applicable, the 44% TSS removal pretreatment requirement, are provided.



Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued) Standard 4: Water Quality (continued) The BMP is sized (and calculations provided) based on: ☐ The ½" or 1" Water Quality Volume or The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume. The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs. A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided. Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs) ☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report. The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted *prior* to the discharge of stormwater to the post-construction stormwater BMPs. The NPDES Multi-Sector General Permit does *not* cover the land use. LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan. All exposure has been eliminated. All exposure has not been eliminated and all BMPs selected are on MassDEP LUHPPL list. The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent. Standard 6: Critical Areas The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area. Critical areas and BMPs are identified in the Stormwater Report.



Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

		e project is subject to the Stormwater Management Standards only to the maximum Extent acticable as a:
		Limited Project
		Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area. Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
		Bike Path and/or Foot Path
		Redevelopment Project
	\boxtimes	Redevelopment portion of mix of new and redevelopment.
\boxtimes	exp	rtain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an olanation of why these standards are not met is contained in the Stormwater Report. The project involves redevelopment and a description of all measures that have been taken to
	imp in \ the and	project involves redevelopment and a description of all measures that have been taken to brove existing conditions is provided in the Stormwater Report. The redevelopment checklist found /olume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment districtural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) proves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Massachusetts Department of Environmental ProtectionBureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued)

	ntinued)
	The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has <i>not</i> been included in the Stormwater Report but will be submitted <i>before</i> land disturbance begins.
	The project is <i>not</i> covered by a NPDES Construction General Permit.
	The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
\boxtimes	The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.
Sta	ındard 9: Operation and Maintenance Plan
	The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
	Name of the stormwater management system owners;
	□ Party responsible for operation and maintenance;
	Schedule for implementation of routine and non-routine maintenance tasks;
	☐ Plan showing the location of all stormwater BMPs maintenance access areas;
	☐ Description and delineation of public safety features;
	○ Operation and Maintenance Log Form.
	The responsible party is <i>not</i> the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
	A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
	A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.
Sta	andard 10: Prohibition of Illicit Discharges
\boxtimes	The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
\boxtimes	An Illicit Discharge Compliance Statement is attached;
	NO Illicit Discharge Compliance Statement is attached but will be submitted <i>prior to</i> the discharge of any stormwater to post-construction BMPs.

Applicant/Project Name: Town of Arlington – Department of Public Works Town Yard Facility

Project Address: 51 Grove Street, Arlington, MA

Application Prepared by:

Firm: Weston & Sampson, Inc. Registered PE: Larry F. Keegan, PE

Below is an explanation of MassDEP Stormwater Standards 1-10 as they apply to the Town of Arlington Public Works Facility project:

GENERAL

The Town of Arlington Department of Public Works (DPW) proposes renovation and expansion to the existing DPW facility located at 51 Grove Street, Arlington, Massachusetts. The proposed site includes the current 4.4-acre parcel used by the DPW situated in the north and central portion of project site, and an adjacent 1.4 acre town owned lot currently occupied by the Arlington High School soccer field situated in the south portion of the project site, resulting in a total project area of 5.8 acres. The site is bordered by Grove Street to the east, the Minuteman Commuter Bikeway to the north, Arlington High School (AHS) Athletic Fields to the east and southeast, and residential buildings to the southwest. A locus map of the site, as well as other site mapping, is included in Appendix A.

The existing DPW facility includes seven, one to two-story buildings that range in footprint area from approximately 1,300 to 20,000 square feet (SF), a fuel island, several concrete pads, and several concrete walls/material storage bins up to about 5 feet (ft.) tall. The ground surface at the site is mostly comprised of bituminous concrete pavement. The soccer field is grass surfaced with minimal trees and bushes along the south and west sides.

Two 15 ft wide Massachusetts Water Resource Authority (MWRA) sewer easements cross the approximate middle of the site in a west to east directions. The easements include 42-inch diameter reinforced concrete (RCP) pipes with invert elevations approximately 12 to 18 feet below existing surface grades. Mill Brook runs parallel to the MWRA sewer easements and is buried below the site and one of the existing DPW buildings. While the majority of the Mill Brook is underground, it opens up to the surface at three distinct locations throughout the site: at the upstream point, adjacent to Grove Street, midpoint of the site, and downstream point, adjacent to the Arlington High School property.

Other subsurface utilities at the site include water, gas, electric, stormwater drainage, and sewer. Ground surface elevations at the site generally slope down from the south at El. 69 to the north at El. 54 ft, creating a significant grade differentiation. The majority of the existing DPW structures are located at the lower portion of the site with average ground surface elevation of 55 ft. The upper portion of the site has an average ground surface elevation of 65 ft and contains accessory DPW storage structures, fueling facility, and parking areas.



The site is environmentally contaminated from past uses. The existing DPW facility is covered under a Class C-1 Partial Response Action Outcome (RAO). The existing soccer field is covered under MassDEP Release Tracking Notification (RTN) 3-4241. Environmental direct contact barriers include the bituminous pavement surface at the DPW facility and 2 ft. of "clean" granular fill at the north end of the soccer field. A series of subsurface 12-inch perforated flat pipes are located within the direct contact barrier below the soccer field. An engineered barrier is located at the south end of the soccer field and includes a 12-inch thick vegetative support layer and a 12-inch thick drainage layer above a geosynthetic containment layer. The Engineered Barrier and the Direct Contact Barriers will need to be maintained to prevent exposure to underlying contaminated soil through direct contact, ingestion, or inhalation.

The proposed project includes construction of an approximately 43,000 SF 2-story Department of Public Works (DPW) building (Building E) at the site south end of the existing DPW facility, an approximately 6,000 SF salt shed east of the new DPW building, a fuel island south of the new DPW building, and an approximately 260 ft. long retaining wall with retained earth heights up to 12 ft. along the southeast side of the existing DPW facility. Additional proposed site improvements include new paved access road and parking areas in the existing DPW facility and soccer field areas, concrete equipment/container pads, material storage bins, and new subsurface utilities including an underground stormwater detention structure south of the new fuel island. Demolition of existing structures in the south side of the existing DPW facility will be required for the proposed construction.

The DPW building will include equipment repair, employee, shop, wash bay, and administration/engineering areas. Concurrently with construction of the new DPW building, the existing buildings on the site (Building A, B, C, and D) will be renovated to support the Town's Inspection Services Department, Facilities Department, and Information Technology Department). Minor site improvements will take place on the lower portion of Site, including minor re-grading to improve drainage, and repaving of the existing vehicular circulation areas.

Debris from the site preparation will be transported in covered container vehicles for off-site disposal or recycling. Erosion control measures, including the use of erosion control devices, will be implemented to mitigate sediment migration outside the limits of work. Catch basin protection will be implemented for all catch basins affected by the work area. Inlet sediment control will be placed in the catch basin to minimize sediment loading into the catch basin.

Environmental protection measures will also include dust control to ensure that generation of on-site dust during work activities will be minimized. Dust control activities will not add to any additional stormwater runoff at the site, as dust control will not be used during storm events. Wet suppression shall be used to provide temporary control of dust. At a minimum, wet suppression shall be applied to demolition debris, excavated material, aggregate piles, and exposed soils and dirt. Dust suppression wetting agents shall be water soluble, non-toxic, non-reactive, non-volatile, and non-foaming and will not result in ponding of water.

As detailed herein, this Stormwater Management Report:

- Demonstrates compliance with the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards;
- Demonstrates compliance with the Town of Arlington Conservation Commission;



- Details construction-phase erosion and sedimentation controls, inspection requirements and maintenance requirements to protect downstream receiving waters; and,
- Presents a detailed long-term operation and maintenance plan for the stormwater management system and the site.

Stormwater Management: The approach to stormwater management for the project consists of maintaining existing drainage patterns and outfalls, installing structural BMP's to provide water quality treatment, and improving environmentally sensitive areas of the site within environmental and physical constraints of the site. To achieve this, the runoff from the driveways, parking, and circulation areas will be conveyed to deep sump catch basins and hydrodynamic separators prior to discharge. The runoff from the parking lot proposed within existing soccer field will be stored in an underground detention area and discharged at a reduced rate to ensure that the post-development flow rate will not exceed the existing rate. The areas directly adjacent to the Mill Brook surface openings will be improved by removing sections of pavement adjacent to the brook and installing of pervious biofiltration pockets with native plantings, which will provide filtration to runoff entering the culvert through surface flow.

Stormwater Design: Weston & Sampson utilized HydroCAD computer software to model the stormwater runoff for 2-year, 10-year, 25-year, 50-year and 100-year 24-hour storm events. The rainfall amounts used for the analysis was based on the extreme precipitation tables obtained from the Northeast Regional Climate Center at Cornell. The rainfall depths were 3.23 inches, 4.88 inches, 6.19 inches, 7.42 in, and 8.89 inches, respectively.

Soil information was obtained from the Natural Resources Conservation Service (NRCS) Middlesex County Web Soil Survey. The soil survey indicated Udorthents, and Merrimac-Urban Land complex in the vicinity of the proposed site. Udorthents does not have a Hydrologic Soil Group rating assigned, while the Merrimac – Urban Land complex has Hydrologic Soil Group rating A. The soil map and descriptions are included in Appendix A. To be conservative, a Hydrologic Soil Group A was assumed when determining curve numbers associated with individual drainage areas in the HydroCAD model.

Existing Drainage Conditions

The existing conditions in the project area of the site consists of approximately 232,106 square feet or 88.8% of impervious surface, comprised of the buildings, storage structures, and circulation areas including driveways and parking areas. The pervious areas are limited to the soccer fields in the southern portion of the site and totals 29,333 square feet, or 11.2. Topography on the site generally slopes from south to north, with a step transition portion approximately mid site, between the upper portion of DPW yard and lower portion of DPW yard.

Based on the existing drainage pattern, three existing watershed areas were delineated, shown graphically in Appendix B.

Drainage Area 1 includes much of the existing DPW yard. The stormwater from this area is collected via existing catch basins and is discharge directly to the underground portion of Mill Brook via several discharge points.



Drainage Area 2 includes the area adjacent to Grove Street. The runoff from this area discharges overland to the municipal drainage system in Grove street, which in turn discharges into the Mill Brook, at the upstream section of the stream, as it enters the site

Drainage Area 3 includes southern portion of the project site including the soccer fields, bituminous driveway connecting to the AHS property and areas surround existing fuel island. The stormwater runoff from this area is collected via a network of underground piping and underdrains beneath the soccer field. The runoff further discharges in the easterly direction into the AHS drainage network.

Proposed Drainage Conditions

In the proposed condition the amount of impervious surface on site will be approximately 261,439 square feet (90.8%) and consequently the pervious area will decrease to 24,169 square feet (9.2%) in large part due to the converting the soccer field to a parking lot. To mitigate the runoff from the additional impervious surface in the proposed condition, an underground detention system is proposed. The detention system will ensure that proposed runoff rates will not exceed the existing rate of runoff. The stormwater runoff from the paved areas will be directed into deep sump catch basins and conveyed to stormwater treatment units to provide water quality treatment prior to discharge.

Four watershed (drainage) areas were delineated in the proposed condition and are shown graphically in Appendix B.

Similarly to existing condition, area DA-1 contains majority of the existing DPW site and a large portion of the proposed new Building E roof as well as circulation areas north and east of the Building E. Stormwater system in the lower portion of the site will remain unchanged and will continue discharging into Mill Brook via existing drainage network. The stormwater from the upper portion of the site will be collected via deep sump catch basins and will be treated by a proposed hydrodynamic separator prior to discharge into Mill Brook via existing outfall.

Area DA-2 includes the areas along Grove Street frontage. Similarly to existing condition, the runoff from this area will overflow along the driveway to Grove Street, where it will discharge into Mill Brook via municipal drainage system.

Area DA-3a includes larger portion of the proposed parking lot that will be constructed over the soccer field as well as a small portion of the roof from the new DPW building and driveway south of Building E. the runoff from this area will be collected via deep sump catch basins and routed to hydrodynamic separators and further conveyed to the underground detention system. The runoff will be discharge from the detention system via proposed outlet control structure into the existing 12" HDPE pipe that connects with the AHS drainage network

Area DA-3b includes small area of proposed parking lot. The runoff from this area will flow overland to the edge of the parking lot where it will enter a FocalPoint Biofiltration System for treatment. A Focal Point Biofiltration System is a modular biofiltration system that utilizes high performance biofiltration media to achieve pollutant removal consistent with a typical rain garden and achieves 80% TSS removal, and 60% phosphorus removal. The treated stormwater and overflow from larger storms will be conveyed downstream and discharged into the AHS drainage network.



Best Management Practices (BMPs) and Low Impact Development (LID) Measures

Low Impact Development (LID) Measures will be incorporated, where possible, into this project. Existing paved areas will be removed and replaced with loam and seed and plantings where space allows. Unlike the existing condition, the proposed redevelopment provides sediment and oil removal, peak rate attenuation, and groundwater recharge. The BMPs used in this project are described below.

Deep Sump Hooded Catch Basins

The catch basins are to be constructed with a sump (minimum 4-feet) and oil/debris traps to prevent the discharge of sediments and floating contaminants.

Hydrodynamic Separators

The hydrodynamic separators dissipate velocity and allow oil and debris to rise and sediment to settle out.

Rain Garden/Bio-filtration Landscape Areas

Small scale rain garden areas will be incorporated into the design where feasible. These area will aid in removal of pollutants as water filters through the filter media and provide habitat to native plantings.

STANDARD 1 - NO NEW UNTREATED DISCHARGES

The proposed project will create no new untreated discharges. The proposed project was designed to mimic existing conditions as much as possible and improve the condition to the maximum extent practicable. As part of the proposed project, surface runoff from new impervious areas will be collected in deep sump catch basins and conveyed to hydrodynamic separators prior to discharge off the site.

STANDARD 2 – PEAK RATE ATTENUATION

Post construction peak runoff rates at the project site for the 2-, 10-, 25-,50- and 100-year storms will not increase. Supporting documentation is included with this report. A summary table is provided in Appendix B to illustrate that post-construction peak discharge rates will nearly mimic pre-construction rates. To ensure that the work incorporates the performance standards recommended in the DEP's Stormwater Management Policy, necessary erosion and sedimentation control measures will be utilized during construction. These measures will include compost filter tubes, catch basin sediment controls, and a stabilized construction entrance, as depicted on the plans.

STANDARD 3 - RECHARGE

The project site is identified by MassDEP as a contaminated site, where the contamination has been capped in place. This site has an Activity and Use Limitation (AUL) that precludes introducing runoff to the groundwater. Therefore, the recharge standard is not met.



STANDARD 4 - WATER QUALITY

For redevelopment portion of the project, Standard 4 is required to be met only to the maximum extent practicable. Stormwater from all new impervious areas within the project limits will be directed into at least one drainage structure for treatment. The treatment structures utilized on site include deep sump catch basins and hydrodynamic separators. This treatment train provides 47% TSS removal from the stormwater at the upper site. prior to discharge.

Since this project increases the impervious area by approximately 5,000 square feet, a portion of the project site was considered a new development. To achieve compliance with standard 4, the runoff from a portion of proposed parking lot at the southern area of site will be diverted to a Focal Point BioFiltration System, which relies on high performance biofiltration media to filter out pollutants from the rainwater. Focal Point Filtration System achieves 80% TSS removal and 60% total phosphorus removal. Additional information about Focal Point Biofiltration system can be found in Appendix C

Various alternatives were considered to attain higher rate of TSS removal for the redevelopment portion of the site; however, they were not feasible due to the many constraints of the site. Some of the BMP considered for the project included proprietary media filters, tree box filters, and bioretention areas. Due to the contamination of site, any BMP's relying on infiltration were not possible. Similarly, BMP's requiring significant surface area were impractical due the space limitations on site, further limited by utility easements and underground environmental containment measures. However to improve the existing condition, the project will convert impervious areas directly adjacent to the open sections of Mill Brook into a landscaped islands with native plantings and biofiltration soil mix providing filtration of the surface water entering stream via the openings.

STANDARD 5 - LAND USES WITH HIGHER POTENTIAL POLLUTANT LOADS (LUHPPLs)

Because the use of the property will involve maintenance of vehicles, storage of oils and anti-freeze, pavement treatment, and snow storage, the land use has the potential for higher pollutant loads. A Long-Term Pollution Prevention Plan (included in Appendix D) identifies proper procedures of practices for source control and pollution prevention due to the site specific LUHPPL. As this site is a re-development, the project need only to meet the pre-treatment requirement of Standard 5. The 44% TSS Removal pre-treatment will be achieved prior to discharging any runoff from the proposed paved areas. This requirement will be achieved using a treatment train of deep dump catch basins and hydrodynamic separators, combined with incorporating non-structural BMP's such as street sweeping TSS removal worksheets documenting compliance are included in Appendix C of this report.

STANDARD 6 - CRITICAL AREAS

Not applicable. The project site is not located within a Critical Area.

STANDARD 7 – REDEVELOPMENTS AND OTHER PROJECTS SUBJECT TO THE STANDARDS ONLY TO THE MAXIMUM EXTENT PRACTICABLE

Most of the project is considered a redevelopment. However, since the overall impervious area on site increase by 5,164 square feet, due to construction of the proposed parking lot in the area of existing soccer fields, a small portion the project is considered a new development. For



redevelopment portion of the site, the project needs only to meet Standards 2 and 3 to the maximum extent practicable and the pre-treatment requirements of Standards 4, 5, and 6 meet as noted in the Stormwater Handbook. Approximately 5,000 sq feet of the proposed parking lot is considered new development, and therefore will comply with all the applicable regulations, however due to the active ALU on site, it will not meet recharge standard (standard 3) This project has been designed to comply with the Stormwater Management Standards as noted above and below.

However, this project provides significant improvement to the existing conditions. Addition of various BMPs will result in a reduction in annual stormwater pollutant loads from the site. incorporation of an underground infiltration reduces peak runoff rates from the site. Additionally, removing sections of the pavement directly adjacent to the open stream sections and replacing the pavement with bio-filtrating landscaped areas will provide an opportunity of filtering pollutants from any surface waters entering the stream via overland flow.

STANDARD 8 – CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENT CONTROL

A detailed Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan is included in Appendix D of this report. To ensure that the work incorporates the performance standards recommended in the DEP's Stormwater Management Policy, necessary erosion and sedimentation control measures will be utilized during construction. These measures include compost filter tubes, catch basin protection, and a stabilized construction entrance, as depicted on the site plans. In addition, the contractor will be required to produce the SWPPP prior to any land disturbance.

STANDARD 9 - OPERATION AND MAINTENANCE PLAN

An Operations and Maintenance Plan is provided in Appendix D of this report.

STANDARD 10 - PROHIBITION OF ILLICIT DISCHARGES

Illicit discharges will be prevented on the site through the use of spill/discharge prevention measures, along with good housekeeping and BMPs, and in accordance with the Long-Term Pollution Prevention Plan and O&M plan. An Illicit Discharge Compliance Statement has been developed for this site and is included in Appendix D.

REGISTERED PROFESSIONAL ENGINEER'S CERTIFICATION

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-Term Pollution Prevention Plan, Construction Period Erosion and Sedimentation Control Plan, Post-Construction Operation and Maintenance Plan, Illicit Discharge Compliance Statement, and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

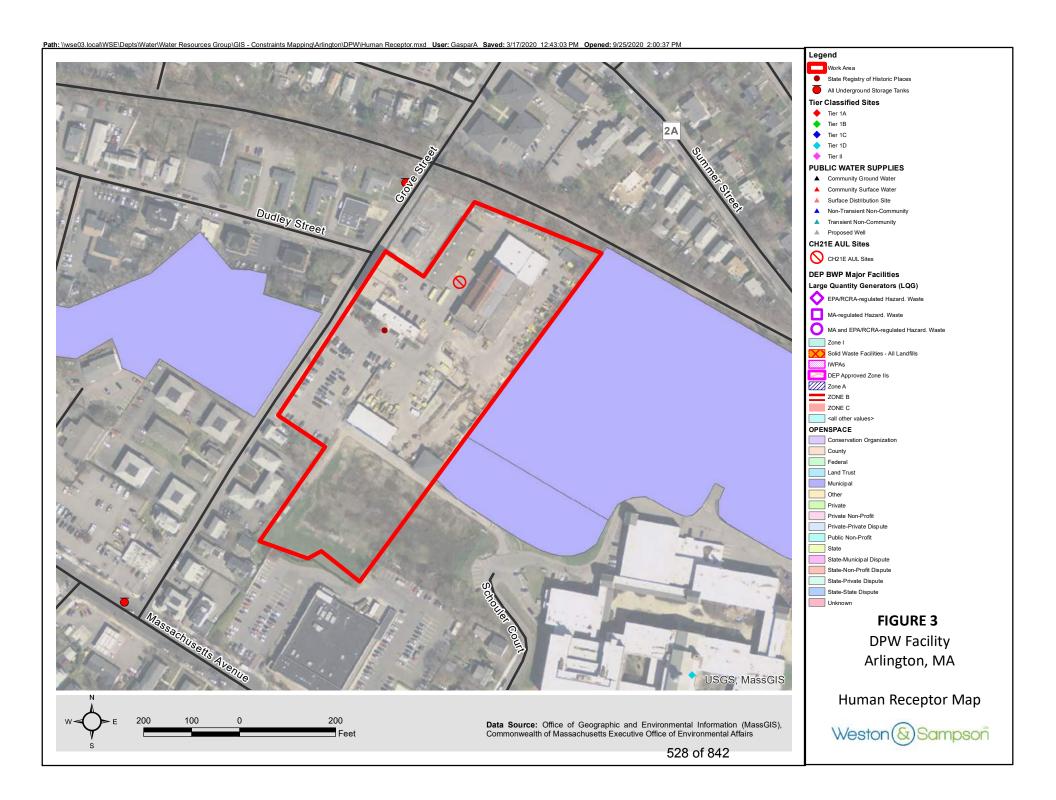
Registered Professional Engineer Block and Signature



Farmence J. Kelson 10.22.2 Signature and Date

APPENDIX A

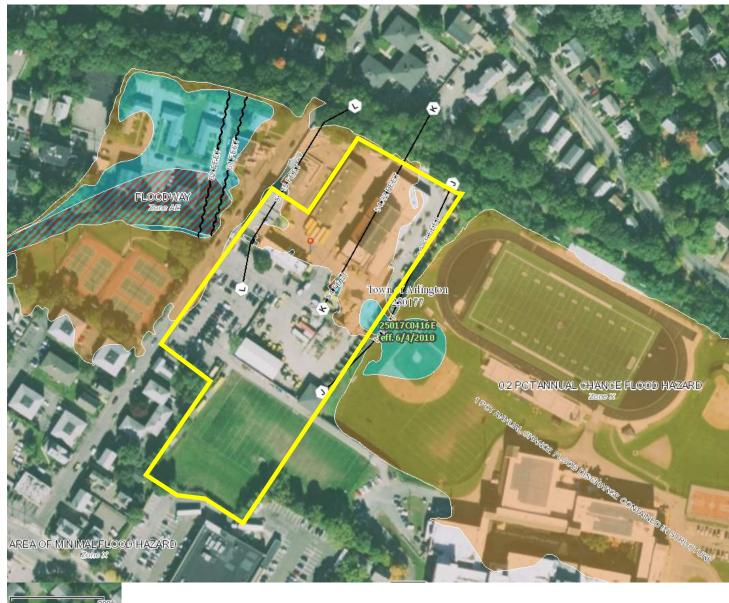




National Flood Hazard Layer FIRMette

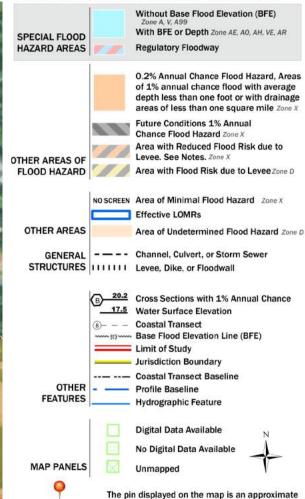
FEMA

71°10'6"W 42°25'26"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT



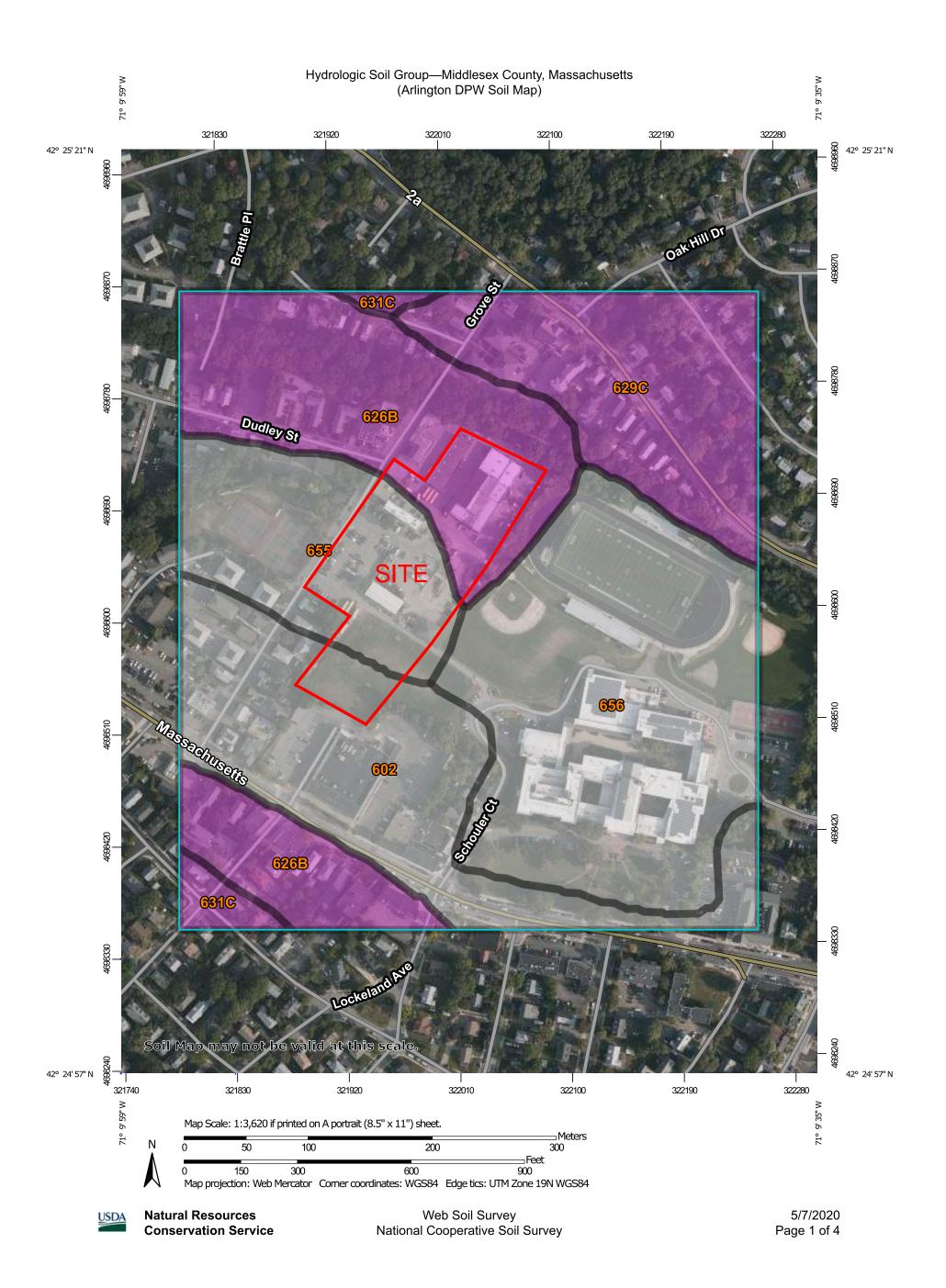
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

point selected by the user and does not represent

an authoritative property location.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/21/2020 at 9:19 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



MAP LEGEND MAP INFORMATION The soil surveys that comprise your AOI were mapped at Area of Interest (AOI) С 1:25,000. Area of Interest (AOI) C/D Soils Warning: Soil Map may not be valid at this scale. D Soil Rating Polygons Enlargement of maps beyond the scale of mapping can cause Not rated or not available Α misunderstanding of the detail of mapping and accuracy of soil **Water Features** line placement. The maps do not show the small areas of A/D Streams and Canals contrasting soils that could have been shown at a more detailed В scale. **Transportation** B/D Rails Please rely on the bar scale on each map sheet for map С measurements. Interstate Highways C/D Source of Map: Natural Resources Conservation Service **US Routes** Web Soil Survey URL: Major Roads Coordinate System: Web Mercator (EPSG:3857) Not rated or not available Local Roads Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts **Soil Rating Lines Background** distance and area. A projection that preserves area, such as the Aerial Photography Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required. This product is generated from the USDA-NRCS certified data as of the version date(s) listed below. Soil Survey Area: Middlesex County, Massachusetts Survey Area Data: Version 19, Sep 12, 2019 C/D Soil map units are labeled (as space allows) for map scales 1:50,000 or larger. Not rated or not available Date(s) aerial images were photographed: Sep 11, 2019—Oct 5, 2019 **Soil Rating Points** The orthophoto or other base map on which the soil lines were Α compiled and digitized probably differs from the background A/D imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident. В B/D

Hydrologic Soil Group

	_			
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
602	Urban land		11.6	19.5%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	А	13.8	23.3%
629C	Canton-Charlton-Urban land complex, 3 to 15 percent slopes	А	8.8	14.8%
631C	Charlton-Urban land- Hollis complex, 3 to 15 percent slopes, rocky	A	1.0	1.7%
655	Udorthents, wet substratum		7.4	12.4%
656	Udorthents-Urban land complex		16.8	28.3%
Totals for Area of Inter	rest	1	59.3	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition
Component Percent Cutoff: None Specified

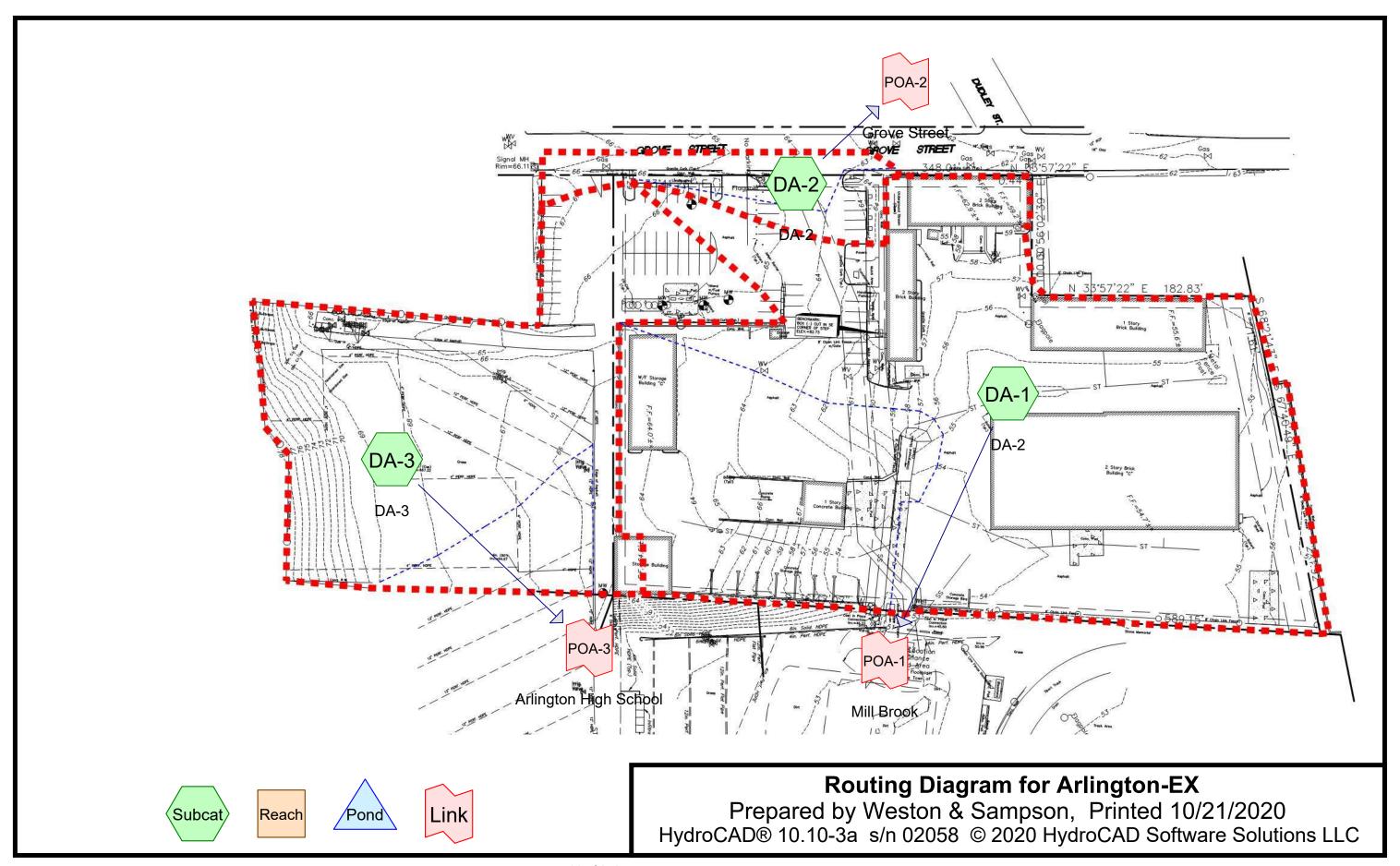
Tie-break Rule: Higher

APPENDIX B



ARLINGTON DPW FACILITY ARLINGTON, MA

			Pre-De	elopment C	onditions vs	. Post-Developme	ent Conditio	ns			
		Pre-Developme	ent Flows				-	ost-Developm	ent Flows		
	2-year storm	10-year storm	25-year storm	50-year storm	100-year storm		2-year storm	10-year storm	25-year storm	50-year storm	100-year storm
Output	3.23 in	4.88 in	6.19 in	7.42 in	8.89 in	Output	3.23 in	4.88 in	6.19 in	7.42 in	8.89 in
Subcatchment/Reach	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)	Subcatchment/Reach	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)
POI 1 Mill Brook	11.44	17.55	22.37	26.88	32.26	POI 1 Mill Brook	10.96	17.14	22.00	26.54	31.95
POI 2 Grove Street	0.86	1.40	1.82	2.21	2.68	POI 2 Grove Street	0.8	1.34	1.77	2.16	2.63
POI 3 Arlington High School	2.44	4.84	6.83	8.73	11.01	POI 3 Arlington High School	1.76	2.64	3.37	4.92	6.01



>	<
Ц	Ц
9	
(0
ŧ	5
Š	
÷	=
ż	1
	•

Arinigion-EA
Prepared by Weston & Sampson
HydroCAD® 10.10-3a sin 02058 © 2020 HydroCAD Software Solutions LLC

Existign Conditions

Printed 10/22/2020 Page 1

Depth AMC (inches)

Duration B/B

Curve Mode

Storm Type

Event Name

Event#

(hours)

Rainfall Events Listing

2 2 2 2 2 3.23 4.88 6.19 7.42 8.89

24.00 24.00 24.00 24.00 24.00

Default Default Default Default Default

Type III 24-hr Type III 24-hr Type III 24-hr Type III 24-hr

2-Year 10-Year 25-Year 50-Year 100-Year

Existign Conditions

Printed 10/22/2020 Page 2

Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

CN Description	(subcatchment-numbers)	9 50-75% Grass cover, Fair, HSG A (DA-1)	9 >75% Grass cover, Good, HSG A (DA-2, DA-3)	98 Paved parking, HSG A (DA-1, DA-2, DA-3)	11 TOTAL ARFA
	_	7 7	_	-	6
Area	(sd-ft)	2,792	26,541	232,106	261.439

Arlington-EX Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 ® 2020 HydroCAD Software Solutions LLC					Ш		
Arlington-EX Prepared by Westr <u>HydroCAD® 10.10-3a</u>					Ш		
Prepared by Westc						Existign Conditions	
	on & Sampsc	on 2020 HydroCAE	Software Soluti	ions LLC	<u>.</u>	Printed 10/22/2020 Page 4	
		Ground (Ground Covers (all nodes)	(səpc			
HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	S Z
2,792	0	0	0	0	2,792	50-75% Grass	
26,541	0	0	0	0	26,541	>75% Grass	
232,106 261,439	o o	o e	o o	o o	232,106 261,439	Paved parking TOTAL AREA	

Existign Conditions

Printed 10/22/2020 Page 3

Arlington-EX Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Soil Listing (all nodes)

Subcatchment Numbers DA-1, DA-2, DA-3

Soil Group

Area (sq-ft) 261,439

HSG A HSG B HSG C HSG D Other

TOTAL AREA

261,439

Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Existign Conditions

Printed 10/22/2020 Page 5

Existign Conditions Type III 24-hr 2-Year Rainfall=3.23" Printed 10/22/2020

Page 6

Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points Runoff by SCS TR-20 method, UH=SCS, Weighted-CN Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Runoff Area=165,210 sf 98.31% Impervious Runoff Depth>2.75" Tc=6.0 min CN=97 Runoff=11.44 cfs 37,803 cf SubcatchmentDA-2: DA-2

SubcatchmentDA-1: DA-2

0.0

12.0 (inches)

0.010

125.0 0.0080

0.00 (feet)

nside-Fi

Height 0.0 (inches)

Diam/Width

⊏

Length (feet)

Out-Invert

n-Invert (feet) 0.00

Line#

Number Node DA-3

Pipe Listing (all nodes)

(inches)

Runoff Area=14,062 sf 89.87% Impervious Runoff Depth>2.24" Tc=6.0 min CN=92 Runoff=0.86 cfs 2,630 cf

Runoff Area=82,167 sf 69.43% Impervious Runoff Depth>1.31" Flow Length=337' Tc=13.3 min CN=80 Runoff=2.44 cfs 8,990 cf SubcatchmentDA-3: DA-3

Link POA-1: Mill Brook

Inflow=11.44 cfs 37,803 cf Primary=11.44 cfs 37,803 cf Inflow=0.86 cfs 2,630 cf Primary=0.86 cfs 2,630 cf Link POA-2: Grove Street

Link POA-3: Arlington High School

Total Runoff Area = 261,439 sf Runoff Volume = 49,423 cf Average Runoff Depth = 2.27" 11.22% Pervious = 29,333 sf 88.78% Impervious = 232,106 sf

Inflow=2.44 cfs 8,990 cf Primary=2.44 cfs 8,990 cf

539 of 842

Existign Conditions
Type III 24-hr 2-Year Rainfall=3.23"
Printed 10/22/2020

Page 7

Existign Conditions Type III 24-hr 2-Year Rainfall=3.23" Printed 10/22/2020

Page 8

Arlington-EX Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment DA-1: DA-2

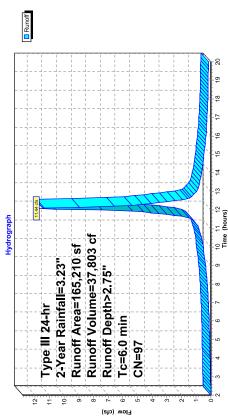
37,803 cf, Depth> 2.75" 11.44 cfs @ 12.09 hrs, Volume=

Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.23"

,	Direct Entry.					0.9
		(cfs)	(ft/sec)	(ft/ft)	(feet)	(min)
	Slope Velocity Capacity Description	Capacity	Velocity	Slope	Tc Length	Tc
	ea	98.31% Impervious Area	8.31% Imp	0,	162,418	, –
		1.69% Pervious Area	69% Per	•	2,792	
		werage	Weighted Average	97	165,210	_
	,	98 Paved parking, HSG A	Paved park	98 F	162,418	ľ
	49 50-75% Grass cover, Fair, HSG A	ass cover, I	50-75% Gr	49	2,792	
			Area (sf) CN Description	CN	rea (sf)	⋖

Subcatchment DA-1: DA-2



Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment DA-2: DA-2

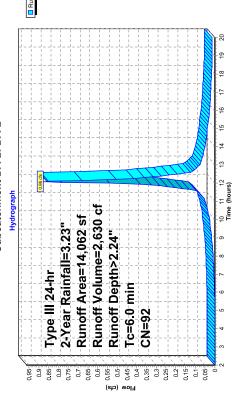
0.86 cfs @ 12.09 hrs, Volume= п Runoff

2,630 cf, Depth> 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.23"

) CN Description		92	5 10.13% Pervious Area	7 89.87% Impervious Area	th Slope Velocity Capacity Description	t) (ft/ft) (ft/sec) (cfs)	Direct Entry,
Area (st)		14,062	1,425	12,637	Tc Length	(min) (feet)	0.9

Subcatchment DA-2: DA-2



Arlington-EX Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Existign Conditions
Type III 24-hr 2-Year Rainfall=3.23"
Printed 10/22/2020
LLC Page 9

Existign Conditions

Type III 24-hr 2-Year Rainfall=3.23"

Printed 10/22/2020

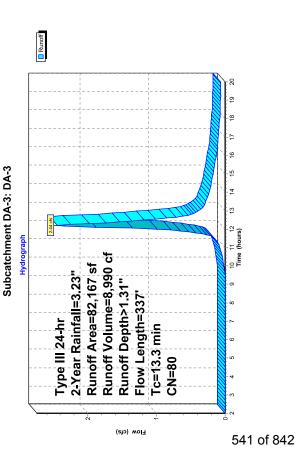
LLC Page 10

Summary for Subcatchment DA-3: DA-3

1.31"
Depth>
8,990 cf,
Volume=
12 19 hrs,
2.44 cfs @
п
Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.23"

	od, HSG A				a	Slope Velocity Capacity Description (fl/ff) (fl/sec) (cfs)	Sheet Flow,	Grass: Short n= 0.150 P2= 3.12"	Shallow Concentrated Flow,	Short Grass Pasture Kv= 7.0 fps	Pipe Channel, PIPE FLOW	12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'	n= 0.010 PVC, smooth interior	
	>75% Grass cover, Good, HSG A	Paved parking, HSG A	/erage	30.57% Pervious Area	69.43% Impervious Area	Capacity (cfs)					4.14			
Area (sf) CN Description	75% Grass	aved parki	Weighted Average	3 57% Per	9.43% Imp	Velocity (ft/sec)	0.15		1.01		5.27			
CN		98 P	80 W	ਲ	Ö		100 0.0150		112 0.0210		125 0.0080			337 Total
rea (sf)	25,116	57,051	82,167	25,116	57,051	Tc Length	100		112		125			337
A						Tc (min)	111		1.8		0.4			13.3



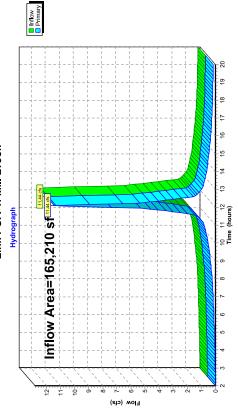
Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Link POA-1: Mill Brook

165,210 sf, 98.31% Impervious, Inflow Depth > 2.75" for 2-Year event 11.44 cfs @ 12.09 hrs, Volume= 37,803 cf Atten= 0%, Lag= 0.0 min Inflow Area = $\Pi = \Pi$ Inflow Primary

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-1: Mill Brook



Arlington-EX Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Existign Conditions Type III 24-hr 2-Year Rainfall=3.23" Printed 10/22/2020

Existign Conditions
Type III 24-hr 2-Year Rainfall=3.23"
Printed 10/22/2020
LLC Page 12

Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

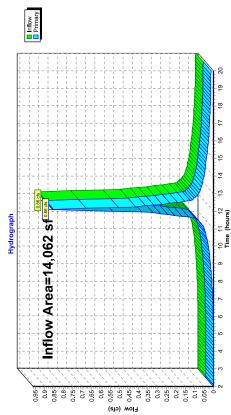
Page 11

14,062 sf, 89.87% Impervious, Inflow Depth > 2.24" for 2-Year event 0.86 cfs @ 12.09 hrs, Volume= 2,630 cf Atten= 0%, Lag= 0.0 min Inflow Area = Inflow = Primary =

Summary for Link POA-2: Grove Street

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-2: Grove Street



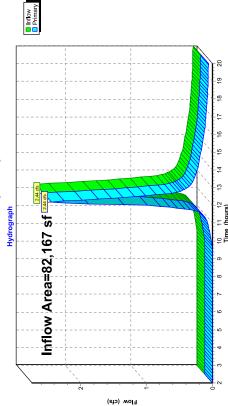
82,167 sf, 69,43% Impervious, Inflow Depth > 1.31" for 2-Year event 2.44 cfs @ 12.19 hrs, Volume= 8,990 cf, Atten= 0%, Lag= 0.0 min Summary for Link POA-3: Arlington High School

Inflow Area = $\Pi = \Pi$

Inflow Primary

Link POA-3: Arlington High School

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs



	Existign Conditions
Arlington-EX Type III 24-hr	Type III 24-hr 10-Year Rainfall=4.88"
Prepared by Weston & Sampson	Printed 10/22/2020
HydroCAD® 10 10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC	Page 13

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points Runoff by SCS TR-20 method, UH=SCS, Weighted-CN Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: DA-2	Runoff Area=165,210 sf 98.31% Impervious Runoff Depth>4.31" Tc=6.0 min CN=97 Runoff=17.55 cfs 59,359 cf
SubcatchmentDA-2: DA-2	Runoff Area=14,062 sf 89,87% Impervious Runoff Depth>3,76" Tc=6.0 min CN=92 Runoff=1.40 cfs 4,410 cf
SubcatchmentDA-3: DA-3	Runoff Area=82,167 sf 69,43% Impervious Runoff Depth>2.60" Flow Length=337 Tc=13.3 min CN=80 Runoff=4.84 cfs 17,784 cf
Link POA-1: Mill Brook	Inflow=17.55 cfs 59,359 cf Primary=17.55 cfs 59,359 cf
Link POA-2: Grove Street	Inflow=1.40 cfs 4,410 cf Primary=1.40 cfs 4,410 cf
Link POA-3: Arlington High School	Inflow=4.84 cfs 17,784 cf Primary=4.84 cfs 17,784 cf

Total Runoff Area = 261,439 sf Runoff Volume = 81,552 cf Average Runoff Depth = 3.74" 11.22% Pervious = 29,333 sf 88.78% Impervious = 232,106 sf

Arlington-EX

Type III 24-hr 10-Year Rainfall=4.88"
Prepared by Weston & Sampson
Printed 10/22/2020
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC
Page 14

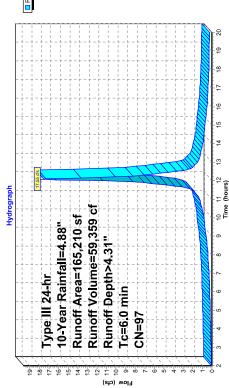
Summary for Subcatchment DA-1: DA-2

Runoff = 17.55 cfs @ 12.09 hrs, Volume= 59,359 cf, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.88"

Area (sf) CN Description	49 50-75% Grass cover, Fair, HSG A	98 Paved parking, HSG A	7 Weighted Average	1.69% Pervious Area	98.31% Impervious Area	Slope Velocity Capacity Description	ft/ft) (ft/sec) (cfs)	Direct Entry,
sf) CN	92 49	18 98	10 97	32		gth SIC	_	
Area (2,792	162,418	165,210	2,792	162,418	Tc Length	(min) (feet)	0.9

Subcatchment DA-1: DA-2



Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Existign Conditions
Type III 24-hr 10-Year Rainfall=4.88"
Printed 10/22/2020
s.LLC Page 15

Existign Conditions
Type III 24-hr 10-Year Rainfall=4.88"
Printed 10/22/2020
5 LLC Page 16

Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

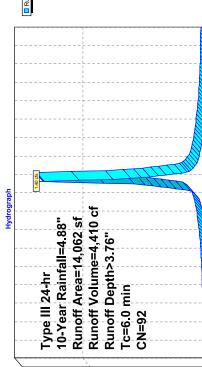
Summary for Subcatchment DA-2: DA-2

4,410 cf, Depth> 3.76" 1.40 cfs @ 12.09 hrs, Volume= Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.88"

Area (sf) CN Description	1,425 39 >75% Grass cover, Good, HSG A	12,637 98 Paved parking, HSG A		1,425 10.13% Pervious Area	12,637 89.87% Impervious Area	c Length Slope Velocity Capacity Description	(feet)	Direct Entry
Area (sf)	1,425	12,637	14,062	1,425	12,637	Tc Length	(min) (feet)	0.9

Subcatchment DA-2: DA-2



Flow (cfs)

17

10 11 12 Time (hours)

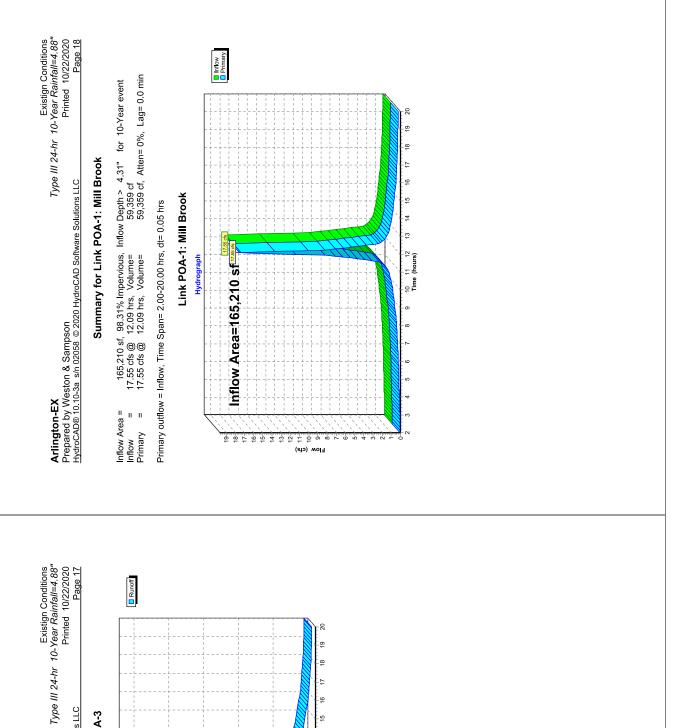
Summary for Subcatchment DA-3: DA-3

[47] Hint: Peak is 117% of capacity of segment #3

17,784 cf, Depth> 2.60" 4.84 cfs @ 12.19 hrs, Volume= П Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.88"

	>75% Grass cover, Good, HSG A				89	Slope Velocity Capacity Description		Sheet Flow,	Grass: Short n= 0.150 P2= 3.12"	Shallow Concentrated Flow,	Short Grass Pasture Kv= 7.0 fps	Pipe Channel, PIPE FLOW	12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'	n= 0.010 PVC, smooth interior	
	cover, Go	Paved parking, HSG A	/erage	30.57% Pervious Area	69.43% Impervious Area	Capacity	(cts)					4.14			
Area (sf) CN Description	75% Grass	aved parki	Weighted Average	0.57% Per	9.43% Imp	Velocity	(ft/sec)	0.15		1.01		5.27			
S		98 P	80 N	ਲ	Ö	Slope	(ft/ft)	100 0.0150		112 0.0210		0.0080			337 Total
rea (sf)	25,116	57,051	82,167	25,116	57,051	Tc Length	(feet)	100		112		125 (337
∢						٦ ۲	(min)	1.1		1.8		0.4			13.3



15

5

10 11 12 Time (hours)

Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Subcatchment DA-3: DA-3

Runoff Volume=17,784 cf Runoff Area=82,167 sf 10-Year Rainfall=4.88"

Type III 24-hr

Runoff Depth>2.60" Flow Length=337

Flow (cfs)

Tc=13.3 min CN=80

Existign Conditions

Type III 24-hr 10-Year Rainfall=4.88"

Printed 10/22/2020

5.LLC

Page 19 Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Existign Conditions

Type III 24-hr 10-Year Rainfall=4.88"

Printed 10/22/2020

S.LLC Page 20

Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

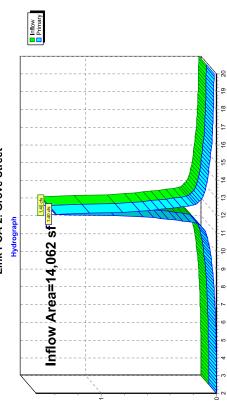
Summary for Link POA-3: Arlington High School

Summary for Link POA-2: Grove Street

Inflow Are	ı II	14,062 sf,	89.87% Impervious,	14,062 sf, 89.87% Impervious, Inflow Depth > 3.76" for 10-Year event	for 10-Year event
nflow	п	1 40 cfs @	1.40 cfs @ 12.09 hrs, Volume=	4,410 cf	
Primary	П	1.40 cfs @	12.09 hrs, Volume=		4,410 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-2: Grove Street



Flow (cfs)

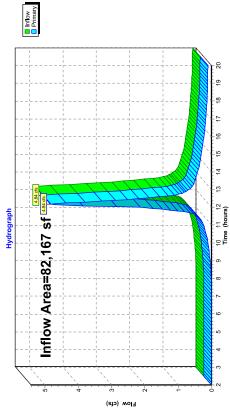
Link POA-3: Arlington High School

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

82,167 sf. 69,43% Impervious, Inflow Depth > 2.60" for 10-Year event 4.84 cfs @ 12.19 hrs, Volume= 17,784 cf 4.84 cfs @ 12.19 hrs, Volume= 17,784 cf, Atten= 0%, Lag= 0.0 min

Inflow Area = $\Pi = \Pi$

Inflow Primary



Existign Conditions Type III 24-hr 25-Year Rainfall=6.19" Printed 10/22/2020 Page 21 Type
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points Runoff by SCS TR-20 method, UH=SCS, Weighted-CN Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Runoff Area=165,210 sf 98.31% Impervious Runoff Depth>5.55" Tc=6.0 min CN=97 Runoff=22.37 cfs 76,472 cf SubcatchmentDA-1: DA-2

Runoff Area=14,062 sf 89.87% Impervious Runoff Depth>4.99" Tc=6.0 min CN=92 Runoff=1.82 cfs 5,847 cf SubcatchmentDA-2: DA-2

Runoff Area=82,167 sf 69.43% Impervious Runoff Depth>3.70" Flow Length=337' Tc=13.3 min CN=80 Runoff=6.83 cfs 25,330 cf SubcatchmentDA-3: DA-3

Inflow=22.37 cfs 76,472 cf Primary=22.37 cfs 76,472 cf Inflow=1.82 cfs 5,847 cf Primary=1.82 cfs 5,847 cf Link POA-2: Grove Street Link POA-1: Mill Brook

Total Runoff Area = 261,439 sf Runoff Volume = 107,648 cf Average Runoff Depth = 4.94" 11.22% Pervious = 29,333 sf 88.78% Impervious = 232,106 sf

Inflow=6.83 cfs 25,330 cf Primary=6.83 cfs 25,330 cf

Link POA-3: Arlington High School

Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC Arlington-EX

Existign Conditions Type III 24-hr 25-Year Rainfall=6.19" Printed 10/22/2020

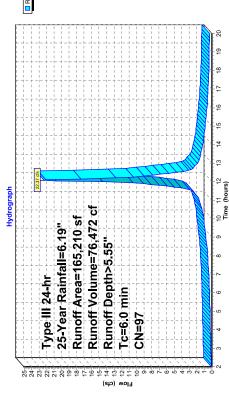
Page 22

Summary for Subcatchment DA-1: DA-2

76,472 cf, Depth> 5.55" 22.37 cfs @ 12.09 hrs, Volume= п Runoff Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.19"

Area (sf) CN Description	49 50-75% Grass cover, Fair, HSG A 98 Paved parking, HSG A	97 Weighted Average 1.69% Pervious Area 98.31% Impervious Area	Slope Velocity Capacity Description (ft/ft) (ft/sec) (cfs)	Direct Entry,
Area (sf)	2,792 162,418	165,210 2,792 162,418	Tc Length (min) (feet)	0.9

Subcatchment DA-1: DA-2



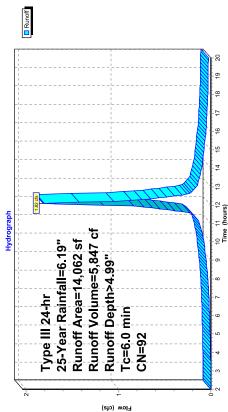
Existign Conditions
Type III 24-hr 25-Year Rainfall=6.19"
Printed 10/22/2020
s LLC Page 23

Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment DA-2: DA-2

5,847 cf, Depth> 4.99" 1.82 cfs @ 12.09 hrs, Volume= Runoff Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.19"

Subcatchment DA-2: DA-2



Existign Conditions
Type III 24-hr 25-Year Rainfall=6.19"
Printed 10/22/2020
s.L.C Page 24 Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

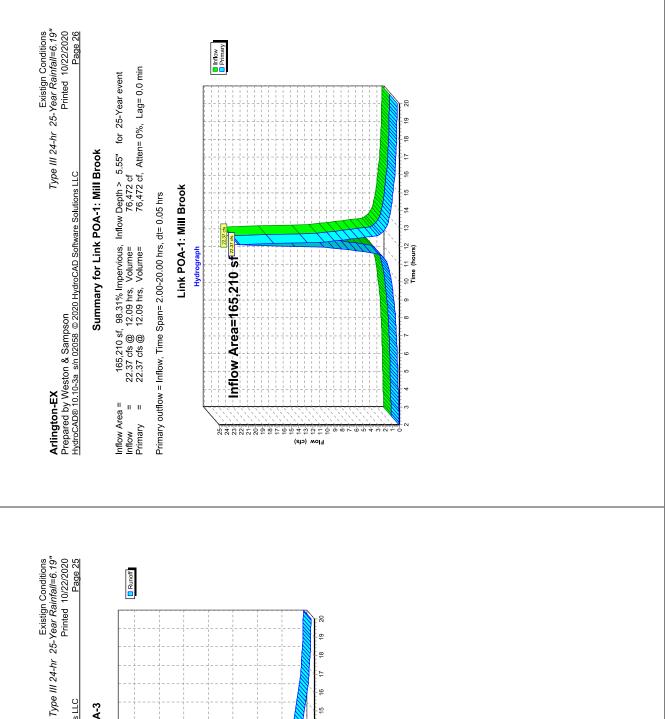
Summary for Subcatchment DA-3: DA-3

[47] Hint: Peak is 165% of capacity of segment #3

25,330 cf, Depth> 3.70" 6.83 cfs @ 12.18 hrs, Volume= П Runoff

Runoff by SCS TR-20 method. UH=SCS. Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

	39 >75% Grass cover, Good, HSG A				а	Slope Velocity Capacity Description	1000	Silect Flow, Grass: Short n= 0.150 P2= 3.12"	Shallow Concentrated Flow,	Short Grass Pasture Kv= 7.0 fps	Pipe Channel, PIPE FLOW	12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'	n= 0.010 PVC, smooth interior	
	cover, Go	Paved parking, HSG A	/erage	30.57% Pervious Area	69.43% Impervious Area	Capacity	(619)				4.14			
Area (sf) CN Description	75% Grass	aved parki	Weighted Average).57% Per	9.43% Imp	Velocity	0.45	2	1.01		5.27			
CN	.< 68	98 P	80 W	ĕ	9		400 0 04E0	0.010	112 0.0210		125 0.0080			337 Total
ea (sf)	25,116	57,051	82,167	25,116	57,051	Tc Length	7	3	112		125			337
Ā						Tc L	7 7 7	-	1.8		0.4			13.3



15 4 3

10 11 12 Time (hours)

Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Subcatchment DA-3: DA-3

Hydrograph

Runoff Volume=25,330 cf Runoff Area=82,167 sf 25-Year Rainfall=6.19"

Type III 24-hr

Runoff Depth>3.70" Flow Length=337

Flow (cfs)

Tc=13.3 min CN=80

Existign Conditions

Type III 24-hr 25-Year Rainfall=6.19"

Printed 10/22/2020

5.LLC

Page 27 Type Prepared by Weston & Sampson HydroCAD Software Solutions LLC HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Existign Conditions
Type III 24-hr 25-Year Rainfall=6.19"
Printed 10/22/2020
5 LLC Page 28

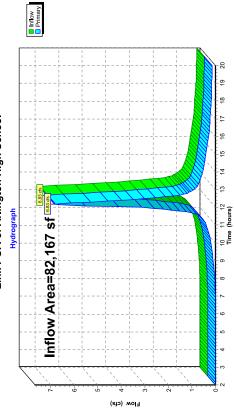
Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Link POA-3: Arlington High School

82,167 sf, 69,43% Impervious, Inflow Depth > 3.70" for 25-Year event 6.83 cfs @ 12.18 hrs, Volume= 25,330 cf, Atten= 0%, Lag= 0.0 min Inflow Area = $\Pi = \Pi$ Inflow Primary

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-3: Arlington High School

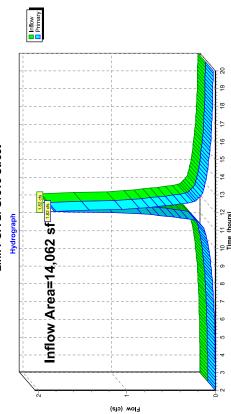


14,062 sf, 89.87% Impervious, Inflow Depth > 4.99" for 25-Year event 1.82 cfs @ 12.09 hrs, Volume= 5,847 cf, Atten= 0%, Lag= 0.0 min Summary for Link POA-2: Grove Street

Link POA-2: Grove Street

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Inflow Area = Inflow = Primary =



Existign Conditions
Type III 24-hr 50-Year Rainfall=7.42"
Printed 10/22/2020
-LLC Page 29 Type
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points Runoff by SCS TR-20 method, UH=SCS, Weighted-CN Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Runoff Area=165,210 sf 98.31% Impervious Runoff Depth>6.72" Tc=6.0 min CN=97 Runoff=26.88 cfs 92,526 cf SubcatchmentDA-1: DA-2

SubcatchmentDA-2: DA-2

Runoff Area=14,062 sf 89.87% Impervious Runoff Depth>6.15" Tc=6.0 min CN=92 Runoff=2.21 cfs 7,204 cf SubcatchmentDA-3: DA-3

Runoff Area=82,167 sf 69.43% Impervious Runoff Depth>4.77" Flow Length=337' Tc=13.3 min CN=80 Runoff=8.73 cfs 32,671 cf Link POA-1: Mill Brook

Inflow=26.88 cfs 92,526 cf Primary=26.88 cfs 92,526 cf Inflow=2.21 cfs 7,204 cf Primary=2.21 cfs 7,204 cf Link POA-2: Grove Street

Total Runoff Area = 261,439 sf Runoff Volume = 132,401 cf Average Runoff Depth = 6.08" 11.22% Pervious = 29,333 sf 88.78% Impervious = 232,106 sf

Inflow=8.73 cfs 32,671 cf Primary=8.73 cfs 32,671 cf

Link POA-3: Arlington High School

Existign Conditions Type III 24-hr 50-Year Rainfall=7.42" Printed 10/22/2020 Page 30 Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC Arlington-EX

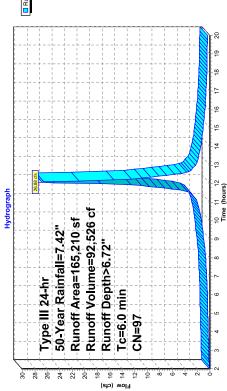
Summary for Subcatchment DA-1: DA-2

92,526 cf, Depth> 6.72" 26.88 cfs @ 12.09 hrs, Volume= п Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 50-Year Rainfall=7.42"

	49 50-75% Grass cover, Fair, HSG A 98 Payed parking HSG A	aa o	Slope Velocity Capacity Description (ft/ft) (ft/sec) (cfs)	Direct Entry,
	50-75% Grass cover, F Payed parking HSG A	Weighted Average 1.69% Pervious Area 98.31% Impervious Area	Capacity (cfs)	
Area (sf) CN Description	0-75% Gra	Weighted Average 1.69% Pervious Area 98.31% Impervious A	Velocity (ft/sec)	
CN	49 5 98 F		Slope (ft/ft)	
ea (st)	2,792 162 418	2,792 2,792 162,418	Tc Length in) (feet)	
Ar	16	= =	Tc (min)	0.9

Subcatchment DA-1: DA-2



Existign Conditions

Type III 24-hr 50-Year Rainfall=7.42"

Printed 10/22/2020

5.LLC

Page 31 Type
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Existign Conditions
Type III 24-hr 50-Year Rainfall=7.42"
Printed 10/22/2020
5 LLC Page 32

Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Arlington-EX

Summary for Subcatchment DA-3: DA-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 50-Year Rainfall=7.42"

32,671 cf, Depth> 4.77"

8.73 cfs @ 12.18 hrs, Volume=

П

Runoff

[47] Hint: Peak is 211% of capacity of segment #3

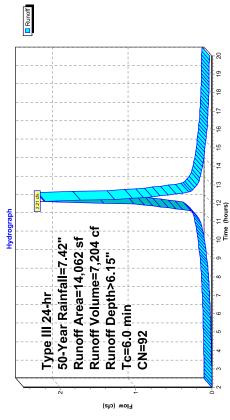
Summary for Subcatchment DA-2: DA-2

7,204 cf, Depth> 6.15" 2.21 cfs @ 12.09 hrs, Volume= Runoff

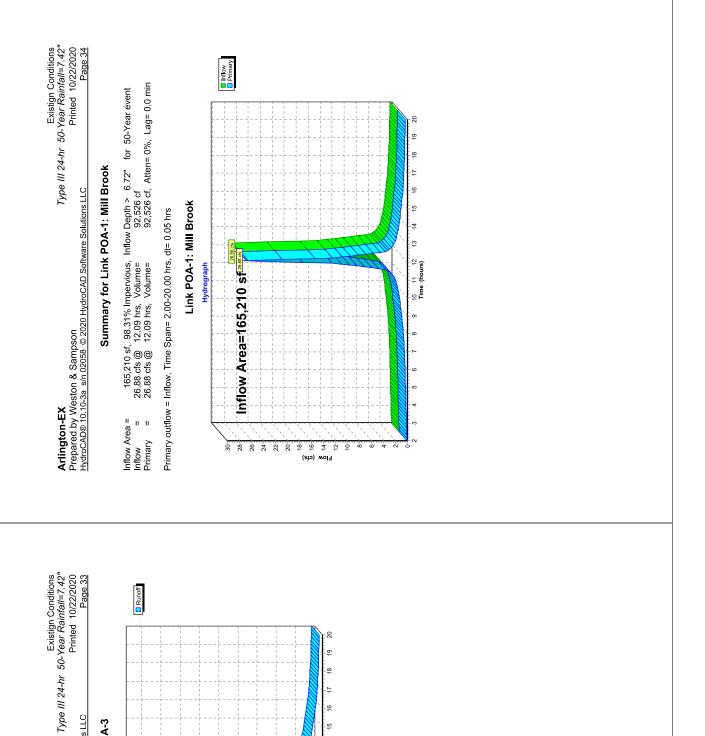
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 50-Year Rainfall=7.42"

Area (sf) CN Description	39 >75% Grass cover, Good, HSG A	98 Paved parking, HSG A	92 Weighted Average 10.13% Pervious Area	89.87% Impervious Area	Slope Velocity Capacity Description (ft/ft) (ft/sec) (cfs)	Direct Entry,
Area (sf)	1,425	12,637	14,062 1,425	12,637	Tc Length (min) (feet)	0.9

Subcatchment DA-2: DA-2



Sheet Flow,
Grass: Short n= 0.150 P2= 3.12"
Shallow Concentrated Flow,
Short Grass Pasture Kv= 7.0 fps
12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
n= 0.010 PVC, smooth interior Description >75% Grass cover, Good, HSG A Paved parking, HSG A Weighted Average 30.57% Pervious Area 69.43% Impervious Area Capacity (cfs) 4.14 Description Velocity 0.15 5.27 1.01 (ft/sec Slope (ft/ft) 0.0210 0.0080 0.0150 Total S 88 80 Length (feet) 100 112 125 337 25,116 57,051 82,167 25,116 57,051 Area (sf) 1.8 13.3 (min) 0.4



15 4 9

10 11 12 Time (hours)

Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Subcatchment DA-3: DA-3

Hydrograph

Runoff Volume=32,671 cf Runoff Area=82,167 sf 50-Year Rainfall=7.42"

Type III 24-hr

Runoff Depth>4.77" Flow Length=337

Flow (cfs)

Tc=13.3 min CN=80

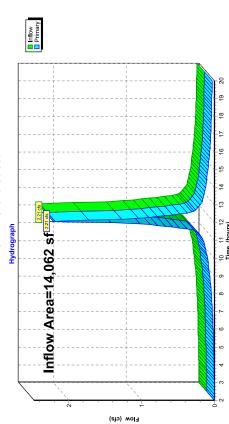
Existign Conditions
Type III 24-hr 50-Year Rainfall=7.42"
Printed 10/22/2020
s LLC Page 35 Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Link POA-2: Grove Street

Inflow Depth > 6.15" for 50-Year event	7,204 cf	7,204 cf, Atten= 0%, Lag= 0.0 min
14,062 sf, 89.87% Impervious, Inflow Depth > 6.15"	2.21 cfs @ 12.09 hrs, Volume=	2.21 cfs @ 12.09 hrs, Volume=
Inflow Area =	lnflow =	Primary =

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-2: Grove Street



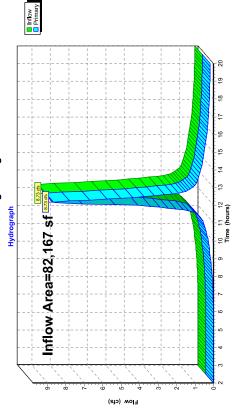


Summary for Link POA-3: Arlington High School

Inflow Depth > 4.77" for 50-Year event	32,671 cf	32,671 cf, Atten= 0%, Lag= 0.0 min
82,167 sf, 69.43% Impervious,	8.73 cfs @ 12.18 hrs, Volume=	8.73 cfs @ 12.18 hrs, Volume=
Inflow Area =	= luflow =	Primary =

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-3: Arlington High School



Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Existign Conditions Type III 24-hr 100-Year Rainfall=8.89" Printed 10/22/2020

Page 37

Existign Conditions Type III 24-hr 100-Year Rainfall=8.89" Printed 10/22/2020

Page 38

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points Runoff by SCS TR-20 method, UH=SCS, Weighted-CN Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Runoff Area=165,210 sf 98.31% Impervious Runoff Depth>8.11" Tc=6.0 min CN=97 Runoff=32.26 cfs 111,693 cf SubcatchmentDA-1: DA-2

Runoff Area=14,062 sf 89.87% Impervious Runoff Depth>7.54" Tc=6.0 min CN=92 Runoff=2.68 cfs 8,834 cf SubcatchmentDA-2: DA-2

Runoff Area=82,167 sf 69.43% Impervious Runoff Depth>6.08" Flow Length=337' Tc=13.3 min CN=80 Runoff=11.01 cfs 41,649 cf SubcatchmentDA-3: DA-3

Inflow=32.26 cfs 111,693 cf Primary=32.26 cfs 111,693 cf Link POA-2: Grove Street Link POA-1: Mill Brook

Inflow=2.68 cfs 8,834 cf Primary=2.68 cfs 8,834 cf Inflow=11.01 cfs 41,649 cf Primary=11.01 cfs 41,649 cf

Link POA-3: Arlington High School

Total Runoff Area = 261,439 sf Runoff Volume = 162,176 cf Average Runoff Depth = 7.44" 11.22% Pervious = 29,333 sf 88.78% Impervious = 232,106 sf

Arlington-EX

Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

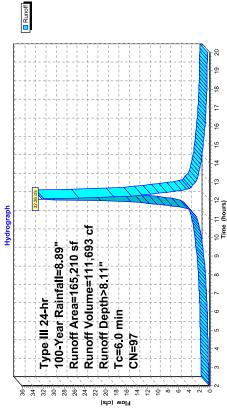
Summary for Subcatchment DA-1: DA-2

111,693 cf, Depth> 8.11" 32.26 cfs @ 12.09 hrs, Volume= Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.89"

CN Description	49 50-75% Grass cover, Fair, HSG A	98 Paved parking, HSG A	97 Weighted Average	1.69% Pervious Area	98.31% Impervious Area	n Slope Velocity Capacity Description	(ft/ft) (ft/sec) (cfs)	Direct Entry,
Area (sf) (2,792	162,418	165,210	2,792	162,418	Tc Length	(min) (feet)	0.9

Subcatchment DA-1: DA-2



ò Arlington-EX Prepared by Wes HydroCAD® 10.10-3

Existign Conditions
Type III 24-hr 100-Year Rainfall=8.89"
Printed 10/22/2020
ns LLC
Page 39

Existign Conditions
Type III 24-hr 100-Year Rainfall=8.89"
Printed 10/22/2020
ns LLC
Page 40

Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment DA-3: DA-3

[47] Hint: Peak is 266% of capacity of segment #3

41,649 cf, Depth> 6.08" 11.01 cfs @ 12.18 hrs, Volume= П Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.89"

	39 >75% Grass cover, Good, HSG A 98 Paved narking HSG A	ee	To Length Slope Velocity Capacity Description in) (feet) (ft/ft) (ft/sec) (cfs)	Sheet Flow,	Grass: Short n= 0.150 P2= 3.12" Shallow Concentrated Flow,	Short Grass Pasture Kv= 7.0 fps Pipe Channel, PIPE FLOW	12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior	
	>75% Grass cover, God Payed parking HSG A	Weighted Average 30.57% Pervious Area 69.43% Impervious Area	Capacity (cfs)			4.14		
Area (sf) CN Description	75% Grass aved parki	Weighted Average 30.57% Pervious A 69 43% Impervious	Velocity (ft/sec)	0.15	1.01	5.27		
CN	39		Slope (ft/ft)	100 0.0150	112 0.0210	0.0080		337 Total
rea (sf)	25,116 57,051	82,167 25,116 57,051	Length (feet)	100	112	125		337
A			Tc L (min)	11.1	1.8	0.4		13.3

Subcatchment DA-2: DA-2

Runoff Volume=8,834 cf

Runoff Depth>7.54"

Tc=6.0 min

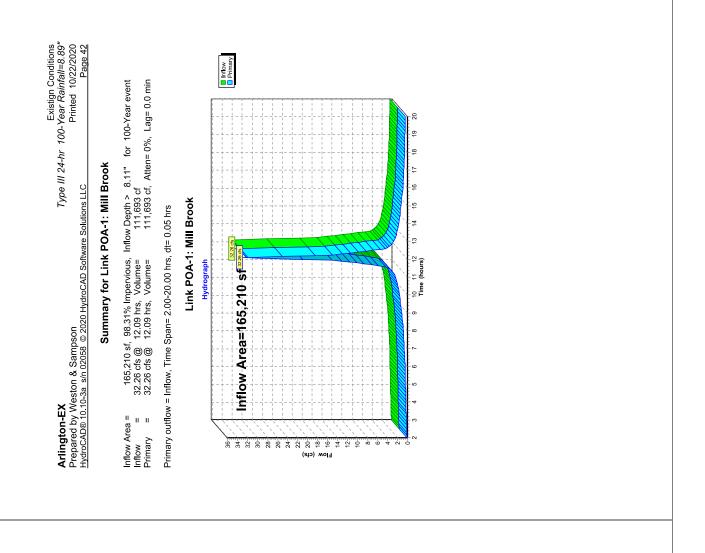
Flow (cfs)

CN=92

100-Year Rainfall=8.89" Runoff Area=14,062 sf

Type III 24-hr

10 11 12 Time (hours)



19

16 17

15

3

10 11 12 Time (hours)

Existign Conditions
Type III 24-hr 100-Year Rainfall=8.89"
Printed 10/22/2020
ns LLC
Page 41

Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Subcatchment DA-3: DA-3

Hydrograph

Runoff Volume=41,649 cf

Runoff Depth>6.08" Flow Length=337'

Flow (cfs)

Tc=13.3 min CN=80

100-Year Rainfall=8.89" Runoff Area=82,167 sf

Type III 24-hr

2 + 5

Existign Conditions
Type III 24-hr 100-Year Rainfall=8.89"
Printed 10/22/2020
ns LLC
Page 43 Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Existign Conditions
Type III 24-hr 100-Year Rainfall=8.89"
Printed 10/22/2020
Is LLC Page 44

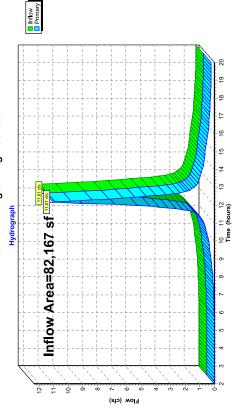
Arlington-EX
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Link POA-3: Arlington High School

82,167 sf, 69,43% Impervious, Inflow Depth > 6.08" for 100-Year event 11.01 cfs @ 12.18 hrs, Volume= 41,649 cf Atten= 0%, Lag= 0.0 min Inflow Area = $\Pi = \Pi$ Inflow Primary

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-3: Arlington High School



14,062 sf, 89.87% Impervious, Inflow Depth > 7.54" for 100-Year event 2.68 cfs @ 12.09 hrs, Volume= 8,834 cf, Atten= 0%, Lag= 0.0 min Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

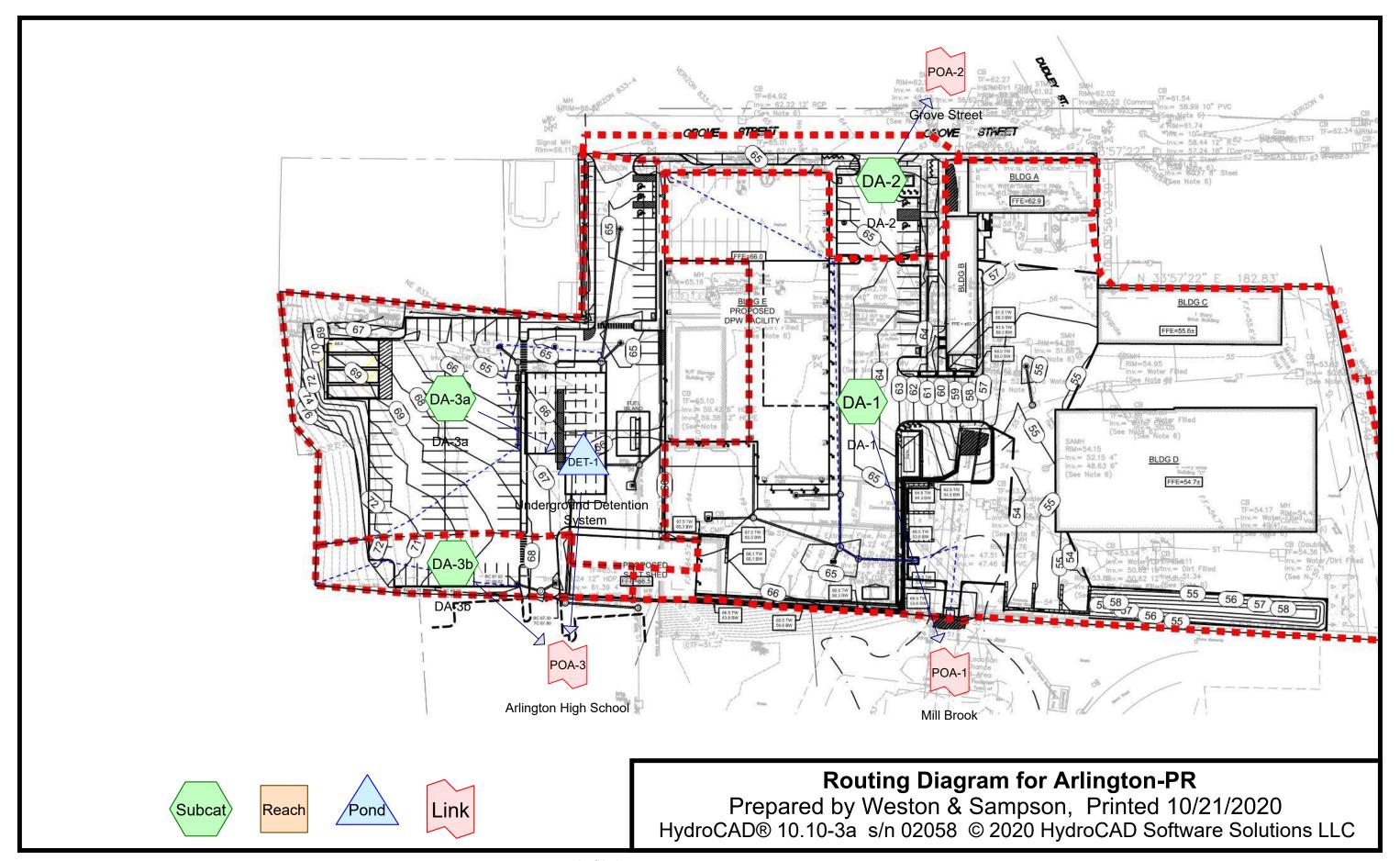
Inflow Area = Inflow = Primary =

Summary for Link POA-2: Grove Street

Link POA-2: Grove Street

Inflow Primary 19 16 10 11 12 Time (hours) Inflow Area≖14,062 sf

Flow (cfs)



Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditons

Printed 10/22/2020 Page 1

Depth AMC (inches)

Duration B/B

Curve Mode

Storm Type

Event Name

Event#

(hours)

Rainfall Events Listing

0 0 0 0 0 3.23 4.88 6.19 7.42 8.89

24.00 24.00 24.00 24.00 24.00

Default Default Default Default Default

Type III 24-hr Type III 24-hr Type III 24-hr Type III 24-hr

2-Year 10-Year 25-Year 50-Year 100-Year

Printed 10/22/2020 Page 2 Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditons

Area Listing (all nodes)

N Description	(subcatchment-numbers)	39 >75% Grass cover, Good, HSG A (DA-1, DA-2, DA-3a, DA-3b)	98 Paved parking, HSG A (DA-1, DA-2, DA-3a, DA-3b)	93 TOTAL AREA
S		36	86	6
Area	(tJ-bs)	24,169	237,270	261,439

Proposed Conditons

Printed 10/22/2020 Page 3

Arlington-PR Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Soil Listing (all nodes)

Subcatchment Numbers

Soil Group

Area (sq-ft)

261,439 HSG A DA-1, DA-2, DA-3a, DA-3b 0 HSG B 0 HSG C 0 HSG D 0 Other

TOTAL AREA

261,439

~
፟፝
ᅙ
ing
¥

Animyton-Fr
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditons

Printed 10/22/2020 Page 5

Arlington-PR

Type III 24-hr 2-Year Rainfall=3.23"
Prepared by Weston & Sampson
Printed 10/22/2020
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC
Proposed Conditions
Proposed Conditions

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points Runoff by SCS TR-20 method, UH=SCS, Weighted-CN Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pipe Listing (all nodes)

0.0 Height Inside-Fill (inches) 0.0 (inches) Diam/Width (inches) 12.0 ⊏ 0.010 100.0 0.0120 Slope (ft/ft) Length (feet) Out-Invert 59.40 (feet) In-Invert (feet) 09.09 Number 1 DET-1 Node Line#

ware Solutions LLC

SubcatchmentDA-1: DA-1	Runoff Area=164,858 sf 94.89% Impervious Runoff Depth>2.54" Tc=6.0 min CN=95 Runoff=10.96 cfs 34,835 cf
SubcatchmentDA-2: DA-2	Runoff Area=14,034 sf 87.20% Impervious Runoff Depth>2.07" Tc=6.0 min CN=90 Runoff=0.80 cfs 2,415 cf
SubcatchmentDA-3a: DA-3a	Runoff Area=72,161 sf 84.29% Impervious Runoff Depth>1.98" Tc=6.0 min CN=89 Runoff=3.98 cfs 11,905 cf
SubcatchmentDA-3b: DA-3b	Runoff Area=10,386 sf 74.79% Impervious Runoff Depth>1.52" Tc=6.0 min CN=83 Runoff=0.45 cfs 1,314 cf
Pond DET-1: Underground Detention	Peak Elev=61.50' Storage=3,835 cf Inflow=3.98 cfs 11,905 cf Outflow=1.52 cfs 11,275 cf
Link POA-1: Mill Brook	Inflow=10.96 cfs 34,835 cf Primary=10.96 cfs 34,835 cf
Link POA-2: Grove Street	Inflow=0.80 cfs 2,415 cf Primary=0.80 cfs 2,415 cf
Link POA-3: Arlington High School	Inflow=1.76 cfs 12,589 cf Primary=1.76 cfs 12,589 cf

Total Runoff Area = 261,439 sf Runoff Volume = 50,469 cf Average Runoff Depth = 2.32" 92.76 sf 90.76% Impervious = 237,270 sf

Typu
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditons Type III 24-hr 2-Year Rainfall=3.23" Printed 10/22/2020

Page 7

Proposed Conditions Type III 24-hr 2-Year Rainfall=3.23" Printed 10/22/2020

Typu PR Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 8

Summary for Subcatchment DA-1: DA-1

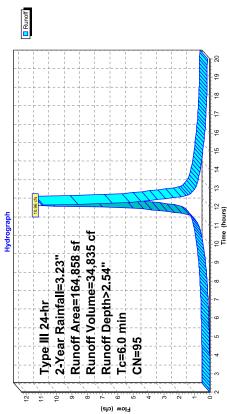
10.96 cfs @ 12.09 hrs, Volume=

Runoff

34,835 cf, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.23"

Subcatchment DA-1: DA-1



Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.23" Summary for Subcatchment DA-2: DA-2 >75% Grass cover, Good, HSG A Paved parking, HSG A 0.80 cfs @ 12.09 hrs, Volume= Description S 88 8

п

Runoff

1,796 12,238

Area (sf)

2,415 cf, Depth> 2.07"

Direct Entry, Capacity Description (cfs) Weighted Average 12.80% Pervious Area 87.20% Impervious Area Velocity (ft/sec) Slope (ft/ft) Length (feet) 14,034 1,796 12,238 Tc (min) 6.0

Subcatchment DA-2: DA-2

🗖 Runoff 18 17 16 -5 10 11 12 Time (hours) Runoff Volume=2,415 cf Runoff Area=14,034 sf 2-Year Rainfall=3.23" Runoff Depth>2.07" Type III 24-hr Tc=6.0 min CN=90 (cfs) wolf 0.55 0.35 0.35 0.8 0.7-0.65 0.6-0.55 0.3 0.2 0.05

Typu
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditons Type III 24-hr 2-Year Rainfall=3.23" Printed 10/22/2020

Page 9

Page 10

1,314 cf, Depth> 1.52"

0.45 cfs @ 12.09 hrs, Volume=

Runoff

Summary for Subcatchment DA-3b: DA-3b

Proposed Conditons Type III 24-hr 2-Year Rainfall=3.23" Printed 10/22/2020 Typu PR Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment DA-3a: DA-3a

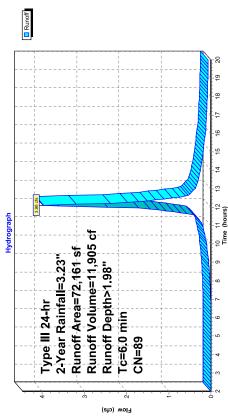
11,905 cf, Depth> 1.98"

3.98 cfs @ 12.09 hrs, Volume=

Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.23"

Subcatchment DA-3a: DA-3a



Tc=6.0 min

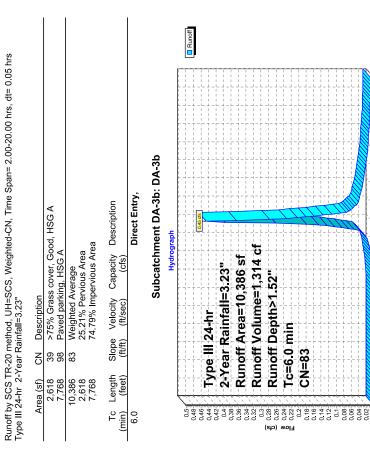
CN=83

- 60

17 16

-5

10 11 12 Time (hours)



Proposed Conditions Type III 24-hr 2-Year Rainfall=3.23" Printed 10/22/2020

Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditions
Type III 24-hr 2-Year Rainfall=3.23"
Printed 10/22/2020
LLC Page 12

Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Pond DET-1: Underground Detention System

72,161 sf, 84.29% Impervious, Inflow Depth > 1.98" for 2-Year event		lume= 11,275 cf, Atten= 62%, Lag= 15.4 min	
34.29% Im	2.09 hrs, \	2.35 hrs, 1	2.35 hrs. \
72,161 sf, 8	3.98 cfs @ 1:	1.52 cfs @ 12.35 hrs, Volume=	1.52 cfs @ 1;
ea =	п	п	II
Inflow Area =	nflow	Outflow	Primary

Routing by Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 61.50' @ 12.35 hrs Surf. Area= 4,480 sf Storage= 3,835 cf

Plug-Flow detention time= 62.2 min calculated for 11,275 of (95% of inflow) Center-of-Mass det. time= 42.8 min (820.6-777.8)

volume Invert Avail.Storage Storage Description	7,672 cf Oldcastle StormCapture SC1 3'x 24	Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf	Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf	4 Rows adjusted for 32.0 cf perimeter wall	5,112 cf Oldcastle StormCapture SC1 3'x 16	Inside= 84.0 "W x 36.0 "H => 20.06 sf x 16.00 "L = 321.0 cf	Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf	4 Down adjunted for 24 0 of norimotor wall
Avail.Storage	7,672 cf				5,112 cf			
Invert	.09'09				.09.09			
Volume	#1				#2			

4 Rows adjusted for 24.0 cf perimeter wall Total Available Storage 12,784 cf

Invert Outlet Devices	60.60' 12.0" Round Culvert	L= 100.0' CMP, projecting, no headwall, Ke= 0.900	nlet / Outlet Invert= 60.60' / 59.40' S= 0.0120 '/' Cc= 0.900	n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf	6.0" Vert. Orifice/Grate X 2.00 C= 0.600	Limited to weir flow at low heads	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir	Head (feet) 0.20 0.40 0.60 0.80 1.00	Coef (English) 2.80 2.92 3.08 3.30 3.32
Invert	60.60' 1	_	=	_	09 09	_	62.60' 4	_	0
Device Routing	#1 Primary				#2 Device 1		#3 Device 1		
Device	#1				#5		#3		

Primary OutFlow Max=1.52 cfs @ 12.35 hrs HW=61.50' (Free Discharge)

—1=Culvert (Passes 1.52 cfs of 1.90 cfs potential flow)

—2=Orifice/Grate (Orifice Controls 1.52 cfs @ 3.88 fps)

—3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Page 11

Inflow Primary Pond DET-1: Underground Detention System 4 16 15 4 13 10 11 12 Time (hours) Inflow Area=72,161 sf Peak Elev=61.50' Storage=3,835 cf

Flow (cfs)

Typα
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditons
Type III 24-hr 2-Year Rainfall=3.23"
Printed 10/22/2020
LLC Page 13

Proposed Conditions
Type III 24-hr 2-Year Rainfall=3.23"
Printed 10/22/2020
LLC Page 14

Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

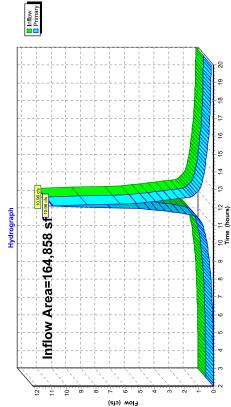
Summary for Link POA-2: Grove Street

Summary for Link POA-1: Mill Brook

Inflow Depth > 2.54" for 2-Year event	34,835 cf	34,835 cf, Atten= 0%, Lag= 0.0 min
164,858 sf, 94.89% Impervious,	10.96 cfs @ 12.09 hrs, Volume=	10.96 cfs @ 12.09 hrs, Volume=
Inflow Area =	lnflow =	Primary =

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-1: Mill Brook

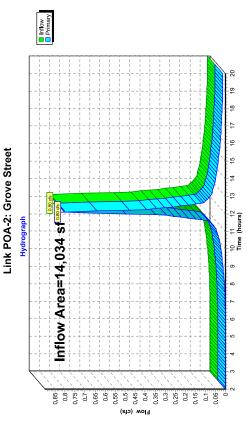


Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

14,034 sf, 87,20% Impervious, Inflow Depth > 2.07" for 2-Year event 0.80 cfs @ 12.09 hrs, Volume= 2,415 cf, Atten= 0%, Lag= 0.0 min

Inflow Area = $\Pi = \Pi$

Inflow Primary



œ	
ቊ	
Ē	
\$	
₽	
.=	
Ξ	
⋖	

Proposed Conditons Type III 24-hr 2-Year Rainfall=3.23" Printed 10/22/2020

Page 15

Proposed Conditons Type III 24-hr 10-Year Rainfall=4.88" Printed 10/22/2020

Page 16

Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Arlington-PR

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Runoff Area=164,858 sf 94.89% Impervious Runoff Depth>4.09" Tc=6.0 min CN=95 Runoff=17.14 cfs 56,171 cf SubcatchmentDA-1: DA-1

SubcatchmentDA-2: DA-2

Runoff Area=14,034 sf 87.20% Impervious Runoff Depth>3.55" Tc=6.0 min CN=90 Runoff=1.34 cfs 4,157 cf

Runoff Area=72,161 sf 84.29% Impervious Runoff Depth>3.45" Tc=6.0 min CN=89 Runoff=6.75 cfs 20,763 cf SubcatchmentDA-3a: DA-3a

Runoff Area=10,386 sf 74.79% Impervious Runoff Depth>2.87" Tc=6.0 min CN=83 Runoff=0.84 cfs 2,487 cf SubcatchmentDA-3b: DA-3b

Peak Elev=62.17' Storage=6,678 cf Inflow=6.75 cfs 20,763 cf Outflow=2.17 cfs 19,979 cf Pond DET-1: Underground Detention

Link POA-1: Mill Brook

Link POA-2: Grove Street

Inflow=1.34 cfs 4,157 cf Primary=1.34 cfs 4,157 cf

Inflow=2.64 cfs 22,466 cf Primary=2.64 cfs 22,466 cf

Inflow=17.14 cfs 56,171 cf Primary=17.14 cfs 56,171 cf

Link POA-3: Arlington High School

Total Runoff Area = 261,439 sf Runoff Volume = 83,579 cf Average Runoff Depth = 3.84" 9.24% Pervious = 24,169 sf 90.76% Impervious = 237,270 sf

9 st Inflow Area=82,547

Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Link POA-3: Arlington High School

Inflow Area = Inflow = Primary =

82,547 sf, 83.09% Impervious, Inflow Depth > 1.83" for 2-Year event 1.76 cfs @ 12.16 hrs, Volume= 12,589 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Flow (cfs)

Proposed Conditons Type III 24-hr 10-Year Rainfall=4.88" Printed 10/22/2020

Page 17

Type
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment DA-1: DA-1

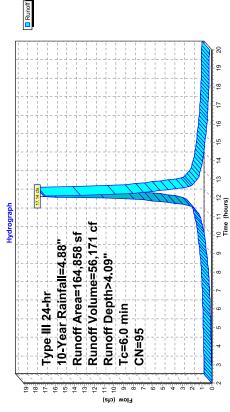
17.14 cfs @ 12.09 hrs, Volume= Runoff

56,171 cf, Depth> 4.09"

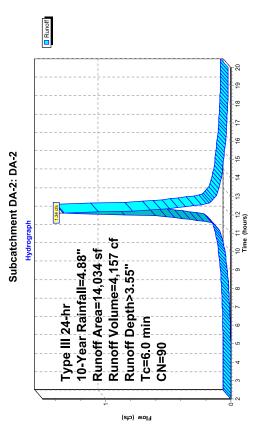
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.88"

Area (sf) CN Description	39 >75% Grass cover, Good, HSG A	98 Paved parking, HSG A	95 Weighted Average 5.11% Pervious Area	94.89% Impervious Area	Slope Velocity Capacity Description (ft/ft) (ft/sec) (cfs)	Direct Entry,
Area (sf)	8,417	156,441	164,858 8,417	156,441	Tc Length (min) (feet)	0.9

Subcatchment DA-1: DA-1



Proposed Conditons Type III 24-hr 10-Year Rainfall=4.88" Printed 10/22/2020 Page 18 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.88" 4,157 cf, Depth> 3.55" Summary for Subcatchment DA-2: DA-2 Type Prepared by Weston & Sampson Prepared by Weston & Sampson HydroCAD Software Solutions LLC. HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC. Direct Entry, Capacity Description (cfs) >75% Grass cover, Good, HSG A Paved parking, HSG A 1.34 cfs @ 12.09 hrs, Volume= 87.20% Impervious Area Weighted Average 12.80% Pervious Area Velocity (ft/sec) Description Slope (ft/ft) S 88 8 Length (feet) 1,796 12,238 14,034 1,796 12,238 Area (sf) п Tc (min) 6.0 Runoff



Proposed Conditons
Type III 24-hr 10-Year Rainfall-4.88"
Printed 10/22/2020
8 LLC Page 19

Type
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditions

Type III 24-hr 10-Year Rainfall=4.88"

Printed 10/22/2020

5.LLC Page 20

Type Prepared by Weston & Sampson Prepared by Weston & Sampson HydroCAD Software Solutions LLC. HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC.

Summary for Subcatchment DA-3b: DA-3b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.88"

>75% Grass cover, Good, HSG A Paved parking, HSG A

Description

Area (sf)

S 88 83

> 2,618 7,768 10,386 2,618 7,768

Weighted Average 25.21% Pervious Area 74.79% Impervious Area

2,487 cf, Depth> 2.87"

0.84 cfs @ 12.09 hrs, Volume=

Runoff

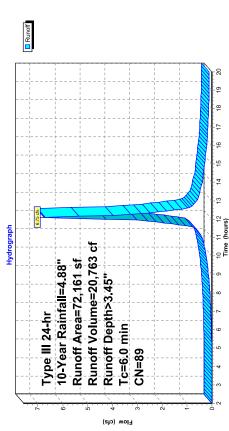
Summary for Subcatchment DA-3a: DA-3a

20,763 cf, Depth> 3.45" 6.75 cfs @ 12.09 hrs, Volume= Runoff

0.05 hrs	
2.00-20.00 hrs, dt= (
ne Span= 2.00-;	
Veighted-CN, Tir	
I, UH=SCS, V	II=4.88"
SCS TR-20 method)-Year Rainfa
unoff by	Type III 24-hr 10

Area (sf) CN Description	39 >75% Grass cover, Good, HSG A	98 Paved parking, HSG A	Weighted Average	15.71% Pervious Area	84.29% Impervious Area	Slope Velocity Capacity Description	/ft) (ft/sec) (cfs)	Direct Entry.
S	33	98	68					
Area (sf)	11,338		72,161	11,338	60,823	Tc Length	(min) (feet)	0.9
	l		l					

Subcatchment DA-3a: DA-3a



Subcatchment DA-3b: DA-3b

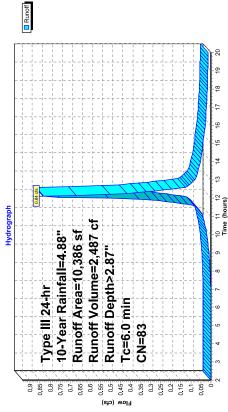
Direct Entry,

Velocity Capacity Description (ft/sec) (cfs)

Slope (ft/ft)

Length (feet)

Tc (min.)



	•
~	
宀	
5	
ğ	
≢	
₹	

Proposed Conditons
Type III 24-hr 10-Year Rainfall-4.88"
Printed 10/22/2020
8 LLC Page 21

Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditions
Type III 24-hr 10-Year Rainfall=4.88"
Printed 10/22/2020
5 LLC Page 22

Summary for Pond DET-1: Underground Detention System

Inflow Area =	a II	72,161 sf,	84.29% In	npervious,	72,161 sf, 84.29% Impervious, Inflow Depth > 3.45" for 10-Year event	Year event
Inflow	п	6.75 cfs @	12.09 hrs,	Volume=	20,763 cf	
Outflow	п	2.17 cfs @ 12.40 hrs, Volume=	12.40 hrs,	Volume=	19,979 cf, Atten= 68%, Lag= 18.5 min	Lag= 18.5 min
Primary	II	2.17 cfs @	12.40 hrs.	Volume=	19.979 cf	

Routing by Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 62.17' @ 12.40 hrs Surf.Area= 4,480 sf Storage= 6,678 cf

Plug-Flow detention time=57.1 min calculated for 19,979 of (96% of inflow) Center-of-Mass det. time= $42.5~{\rm min}$ (807.0 - 764.5)

/olume Invert Avail.Storage Storage Description	7,672 cf Oldcastle StormCapture SC1 3'x 24 Inside= 84 0"W v 36 0"H => 20 06 ef v 16 00! = 321 0 cf	Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf	4 Rows adjusted for 32.0 cf perimeter wall	5,112 cf Oldcastle StormCapture SC1 3'x 16	Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf	Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf	4 Rows adjusted for 24 0 of perimeter wall
Avail Storage	7,672 c			5,112 c			
Invert	.09'09			.09.09			
Volume	#1			#5			

12,784 cf Total Available Storage

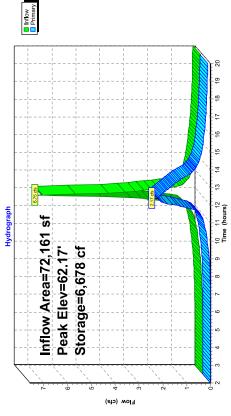
Invert Outlet Devices	60.60' 12.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.60', 59.40' Se 0.0120', Cc= 0.900	n= 0.010 PVC, smooth interfor, Flow Afea= 0.79 st 6.0" Vert. Orffice/Grate X 2.00 C= 0.600 I inflied to weir flow at low heads.	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
Invert	60.60	.09.09	62.60'
Device Routing	#1 Primary	Device 1	#3 Device 1
Device	#	#5	#3

Primary OutFlow Max=2.17 cfs @ 12.40 hrs HW=62.17' (Free Discharge)

—1=Culvert (Passes 2.17 cfs of 3.08 cfs potential flow)
—2=Orifice/Grate (Orifice Controls 2.17 cfs @ 5.53 fps)
—3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC.

Pond DET-1: Underground Detention System



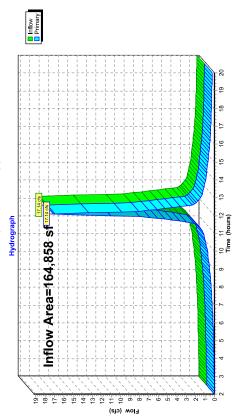
Arlington-PR Type III 24-hr 10-Year Rainfall=4.88 Prepared by Weston & Sampson Printed 10/22/2020	Page 23	HydroCAD® 10 10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC	
	Printed 10/22/2020	Prepared by Weston & Sampson	
	4-111 10-18al Dallilall-4.00		
	A br 40 Voor Boinfall 60		
Proposed Conditions	Proposed Conditons		

_		
ē		
ō		
Ē		
-		
Š		
Ĺ		
5		
5		
SUMMARY TOF LINK POA-1: MIII Brook		
Ē		
Ę		
מ		

Inflow Depth > 4.09" for 10-Year event		56,171 cf, Atten= 0%, Lag= 0.0 min
164,858 sf, 94.89% Impervious, I	17 14 cfs @ 12 09 hrs, Volume=	17 14 cfs @ 12 09 hrs, Volume=
Inflow Area =	lnflow =	Primary =

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-1: Mill Brook

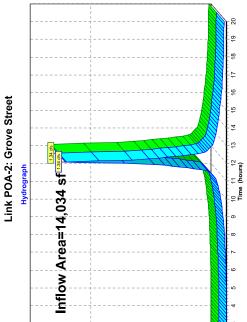




Summary for Link POA-2: Grove Street

Inflow Depth > 3.55" for 10-Year event	4,157 cf	4,157 cf, Atten= 0%, Lag= 0.0 min
14,034 sf, 87.20% Impervious,	.34 cfs @ 12.09 hrs, Volume=	34 cfs @ 12.09 hrs, Volume=
Inflow Area =	Inflow = 1	Primary = 1

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs



Flow (cfs)

Туре	Sampson	lydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC
~	Prepared by Weston & Sampson	10-3a s/n 02058 @
Arlington-PR	Prepared by M	HydroCAD® 10

Proposed Conditions rpe III 24-hr 10-Year Rainfall=4.88" Printed 10/22/2020 LC Page 25

Proposed Conditons Type III 24-hr 25-Year Rainfall=6.19" Printed 10/22/2020

Page 26

Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Arlington-PR

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Runoff Area=164,858 sf 94.89% Impervious Runoff Depth>5.33" Tc=6.0 min CN=95 Runoff=22.00 cfs 73,227 cf Runoff Area=14,034 sf 87.20% Impervious Runoff Depth>4.77" Tc=6.0 min CN=90 Runoff=1.77 cfs 5,574 cf SubcatchmentDA-2: DA-2

SubcatchmentDA-1: DA-1

82,547 sf, 83.09% Impervious, Inflow Depth > 3.27" for 10-Year event 2.64 cfs @ 12.13 hrs, Volume= 22,466 cf Atten= 0%, Lag= 0.0 min

Inflow Area = Inflow = Primary =

Link POA-3: Arlington High School

S-E

Inflow Area=82,547

Flow (cfs)

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Summary for Link POA-3: Arlington High School

Runoff Area=72,161 sf 84.29% Impervious Runoff Depth>4.66" Tc=6.0 min CN=89 Runoff=8.95 cfs 28,001 cf

SubcatchmentDA-3a: DA-3a

Runoff Area=10,386 sf 74.79% Impervious Runoff Depth>4.02" Tc=6.0 min CN=83 Runoff=1.15 cfs 3,476 cf

SubcatchmentDA-3b: DA-3b

Pond DET-1: Underground Detention

Peak Elev=62.71' Storage=8,971 of Inflow=8.95 ofs 28,001 of Outflow=2.96 ofs 27,112 of

Link POA-1: Mill Brook

Link POA-2: Grove Street

Link POA-3: Arlington High School

Inflow=1.77 cfs 5,574 cf Primary=1.77 cfs 5,574 cf

Inflow=22.00 cfs 73,227 cf Primary=22.00 cfs 73,227 cf

Total Runoff Area = 261,439 sf Runoff Volume = 110,278 cf Average Runoff Depth = 5.06" 9.24% Pervious = 24,169 sf 90.76% Impervious = 237,270 sf Inflow=3.37 cfs 30,587 cf Primary=3.37 cfs 30,587 cf

9

572 of 842

Proposed Conditons
Type III 24-hr 25-Year Rainfall=6.19"
Printed 10/22/2020
8 LLC Page 27

Proposed Conditions Type III 24-hr 25-Year Rainfall=6.19" Printed 10/22/2020

Page 28

Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment DA-1: DA-1

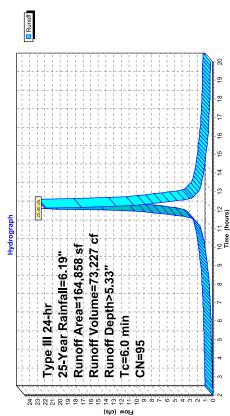
73,227 cf, Depth> 5.33" 22.00 cfs @ 12.09 hrs, Volume=

Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.19"

Area (sf) CN Description	417 39 >75% Grass cover, Good, HSG A	441 98 Paved parking, HSG A	858 95 Weighted Average		441 94.89% Impervious Area	noth Slope Velocity Capacity Description		Direct Entry.
CN	39	98	95					
Area (sf)	8,417	156,441	164,858	8,417	156,441	Tc ength	(min) (feet)	0.9

Subcatchment DA-1: DA-1



Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC.

Summary for Subcatchment DA-2: DA-2

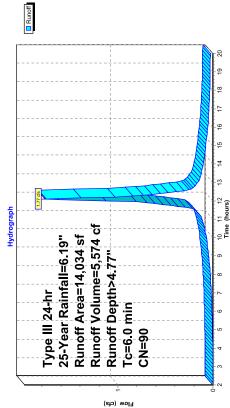
1.77 cfs @ 12.09 hrs, Volume= п Runoff

5,574 cf, Depth> 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.19"

Area (sf) CN Description	39 >75% Grass cover, Good, HSG A	98 Paved parking, HSG A	90 Weighted Average	12.00% Pervious Area	87.20% Impervious Area	٠,	(ft/ft) (ft/sec) (cfs)	Direct Entry,
Area (sf)	1,796	12,238	14,034	0,7,90	12,238	Tc Length	(min) (feet)	0.9

Subcatchment DA-2: DA-2



Type
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditions

Type III 24-hr 25-Year Rainfall=6.19"

Printed 10/22/2020

5.LLC Page 29

Proposed Conditions Type III 24-hr 25-Year Rainfall=6.19" Printed 10/22/2020 Type Prepared by Weston & Sampson Prepared by Weston & Sampson HydroCAD Software Solutions LLC. HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC.

Page 30

3,476 cf, Depth> 4.02"

Summary for Subcatchment DA-3a: DA-3a

28,001 cf, Depth> 4.66"

8.95 cfs @ 12.09 hrs, Volume=

Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.19"

Area (sf) CN Description		98 Paved parking, HSG A		15.71% Pervious Area	84.29% Impervious Area	Slope Velocity Capacity Description) (ft/ft) (ft/sec) (cfs)	Direct Entry,
Area (sf)	11,338	60,823	72,161	11,338	60,823	Tc Length	(min) (feet)	0.9

Subcatchment DA-3a: DA-3a

19 17 10 11 12 Time (hours) Runoff Volume=28,001 cf 25-Year Rainfall=6.19" Runoff Area=72,161 sf Runoff Depth>4.66" Type III 24-hr Tc=6.0 min CN=89

Flow (cfs)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.19" Summary for Subcatchment DA-3b: DA-3b >75% Grass cover, Good, HSG A Paved parking, HSG A 1.15 cfs @ 12.09 hrs, Volume= Description S 88 2,618 7,768 Area (sf) Runoff

🗖 Runoff 18 16 5 10 11 12 Time (hours) Runoff Volume=3,476 cf Runoff Area=10,386 sf 25-Year Rainfall=6.19" Runoff Depth>4.02" Type III 24-hr Tc=6.0 min CN=83

Flow (cfs)

Subcatchment DA-3b: DA-3b

Direct Entry,

Velocity Capacity Description (ft/sec) (cfs)

Slope (ft/ft)

Length (feet)

Tc (min.)

Weighted Average 25.21% Pervious Area 74.79% Impervious Area

83

10,386 2,618 7,768

	•
~	
ᇁ	
5	
ğ	
⋛	
₹	

Proposed Conditions

Type III 24-hr 25-Year Rainfall=6.19"

Printed 10/22/2020

5.LLC Page 31

Proposed Conditions

Type III 24-hr 25-Year Rainfall=6.19"

Printed 10/22/2020

5.LLC Page 32

Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Pond DET-1: Underground Detention System

72,161 sf, 84.29% Impervious, Inflow Depth > 4.66" for 25-Year event	28,001 cf	27,112 cf, Atten= 67%, Lag= 17.8 min	27,112 of
sf, 84.29% Impervious, Inflo-	3.95 cfs @ 12.09 hrs, Volume=	2.96 cfs @ 12.38 hrs, Volume=	2.96 cfs @ 12.38 hrs, Volume=
Inflow Area = 72,161	Inflow = 8.95 cfs @	outflow = 2.96 cfs @	rimary = 2.96 cfs (6

Routing by Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 62.71 @ 12.38 hrs Surf.Area= 4,480 sf Storage= 8,971 cf

Plug-Flow detention time=55.9 min calculated for 27,037 of (97% of inflow) Center-of-Mass det. time= $43.3\,$ min (800.6-757.3)

/olume Invert Avail.Storage Storage Description	7,672 cf Oldcastle StormCapture SC1 3'x 24 Inside= 84 0"W v 36 0"H => 20 06 ef v 16 00! = 321 0 cf	Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf	4 Rows adjusted for 32.0 cf perimeter wall	5,112 cf Oldcastle StormCapture SC1 3'x 16	Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf	Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf	4 Rows adjusted for 24 0 of perimeter wall
Avail Storage	7,672 c			5,112 c			
Invert	.09'09			.09.09			
Volume	#1			#5			

12,784 cf Total Available Storage

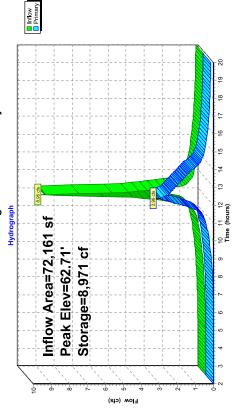
Invert Outlet Devices	60.60' 12.0" Round Culvert	L= 100.0' CMP, projecting, no headwall, Ke= 0.900	Inlet / Outlet Invert= 60.60' / 59.40' S= 0.0120 '/' Cc= 0.900	n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf	6.0" Vert. Orifice/Grate X 2.00 C= 0.600	Limited to weir flow at low heads	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir	Head (feet) 0.20 0.40 0.60 0.80 1.00	Coef. (English) 2.80 2.92 3.08 3.30 3.32
nvert	.09 09				.09 09		62.60		
Device Routing	#1 Primary				#2 Device 1		#3 Device 1		
Devi	#				#		#		

Primary OutFlow Max=2.95 cfs @ 12.38 hrs HW=62.70' (Free Discharge)

—1=Culvert (Passes 2.95 cfs of 3.78 cfs potential flow)
—2=Orifice/Grate (Orifice Controls 2.57 cfs @ 6.56 fps)
—3=Broad-Crested Rectangular Weir (Weir Controls 0.37 cfs @ 0.90 fps)

Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC.

Pond DET-1: Underground Detention System



Proposed Conditions

Type III 24-hr 25-Year Rainfall=6.19"

Printed 10/22/2020

5.LLC Page 33 Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditions
Type III 24-hr 25-Year Rainfall=6.19"
Printed 10/22/2020
5.LLC Page 34

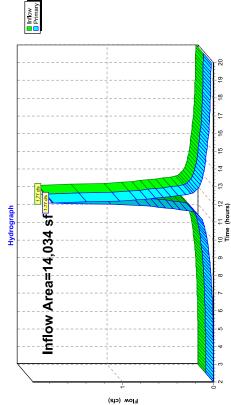
Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC.

Summary for Link POA-2: Grove Street

14,034 sf, 87.20% Impervious, Inflow Depth > 4.77" for 25-Year event 1.77 cfs @ 12.09 hrs, Volume= 5,574 cf 5,574 cf 12.09 hrs, Volume= 5,574 cf, Atten= 0%, Lag= 0.0 min Inflow Area = $\Pi = \Pi$ Inflow Primary

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-2: Grove Street



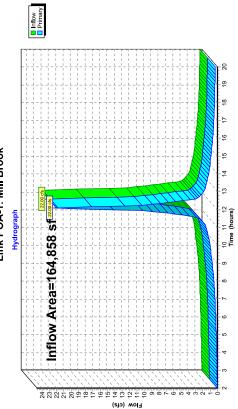
Link POA-1: Mill Brook

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

164.858 sf, 94.89% Impervious, Inflow Depth > 5.33" for 25-Year event 22.00 cfs @ 12.09 hrs, Volume= 73,227 cf, Atten= 0%, Lag= 0.0 min

Inflow Area = Inflow = Primary =

Summary for Link POA-1: Mill Brook



Type
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditions Type III 24-hr 25-Year Rainfall=6.19" Printed 10/22/2020

Arlington-PR

Proposed Conditons Type III 24-hr 50-Year Rainfall=7.42" Printed 10/22/2020

Page 36

Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Link POA-3: Arlington High School

82,547 sf, 83.09% Impervious, Inflow Depth > 4.45" for 25-Year event 3.37 cfs @ 12.36 hrs, Volume= 30,587 cf, Atten= 0%, Lag= 0.0 min

Inflow Area = Inflow = Primary =

Link POA-3: Arlington High School

ş

Inflow Area=82,547

Flow (cfs)

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Page 35

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Runoff Area=164,858 sf 94.89% Impervious Runoff Depth>6.50" Tc=6.0 min CN=95 Runoff=26.54 cfs 89,264 cf SubcatchmentDA-1: DA-1

SubcatchmentDA-2: DA-2

Runoff Area=14,034 sf 87.20% Impervious Runoff Depth>5.92" Tc=6.0 min CN=90 Runoff=2.16 cfs 6,918 cf Runoff Area=72,161 sf 84.29% Impervious Runoff Depth>5.80" Tc=6.0 min CN=89 Runoff=10.99 cfs 34,879 cf SubcatchmentDA-3a: DA-3a

Runoff Area=10,386 sf 74.79% Impervious Runoff Depth>5.12" Tc=6.0 min CN=83 Runoff=1.45 cfs 4,429 cf SubcatchmentDA-3b: DA-3b

Inflow Primary

Peak Elev=63.04' Storage=10,410 cf Inflow=10.99 cfs 34,879 cf Outflow=4.16 cfs 33,904 cf Pond DET-1: Underground Detention

Inflow=26.54 cfs 89,264 cf Primary=26.54 cfs 89,264 cf

Link POA-1: Mill Brook

Link POA-2: Grove Street

Inflow=2.16 cfs 6,918 cf Primary=2.16 cfs 6,918 cf

Inflow=4.92 cfs 38,333 cf Primary=4.92 cfs 38,333 cf Link POA-3: Arlington High School

Total Runoff Area = 261,439 sf Runoff Volume = 135,490 cf Average Runoff Depth = 6.22" 9.24% Pervious = 24,169 sf 90.76% Impervious = 237,270 sf

9

10 11 12 Time (hours)

Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditions

Type III 24-hr 50-Year Rainfall=7.42"

Printed 10/22/2020

5.LLC Page 37

Page 38

Proposed Conditions Type III 24-hr 50-Year Rainfall=7.42" Printed 10/22/2020

Type Prepared by Weston & Sampson Prepared by Weston & Sampson HydroCAD Software Solutions LLC. HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC.

Summary for Subcatchment DA-2: DA-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 50-Year Rainfall=7.42"

>75% Grass cover, Good, HSG A Paved parking, HSG A

Description

Area (sf)

S 88 8

> 1,796 12,238 14,034 1,796 12,238

6,918 cf, Depth> 5.92"

2.16 cfs @ 12.09 hrs, Volume=

Runoff

Summary for Subcatchment DA-1: DA-1

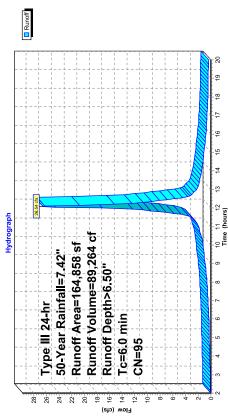
89,264 cf, Depth> 6.50" 26.54 cfs @ 12.09 hrs, Volume= Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 50-Year Rainfall=7.42"	Area (sf) CN Description	39 >75% Grass cover, Good, HSG A	98 Paved parking, HSG A	95 Weighted Average	5.11% Pervious Area	94.89% Impervious Area
R-20 Year	S	39	98	95		
Runoff by SCS TR-20 method, UH=S Type III 24-hr 50-Year Rainfall=7.42"	Area (sf)	8,417	156,441	164,858	8,417	156,441

Description Capacity (cfs) Velocity (ft/sec) Slope (ft/ft)

Direct Entry, Tc Length (min) (feet) 6.0

Subcatchment DA-1: DA-1



Subcatchment DA-2: DA-2

Direct Entry,

Capacity Description (cfs)

Velocity (ft/sec)

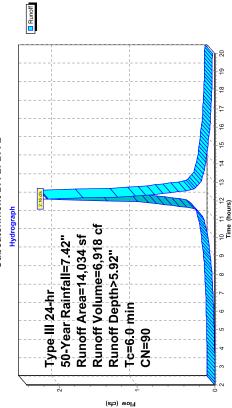
Slope (ft/ft)

Length (feet)

Tc (min) 6.0

87.20% Impervious Area

Weighted Average 12.80% Pervious Area



Proposed Conditions
Type III 24-hr 50-Year Rainfall=7.42"
Printed 10/22/2020
s LLC Page 39

Proposed Conditions
Type III 24-hr 50-Year Rainfall=7.42"
Printed 10/22/2020
5.LLC Page 40

Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment DA-3a: DA-3a

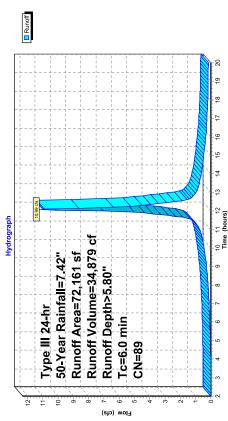
10.99 cfs @ 12.09 hrs, Volume= Runoff

34,879 cf, Depth> 5.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 50-Year Rainfall=7.42"

scription 5% Grass ved parkin iighted Ave 71% Pervi 71% Impe Velocity (39 >75% Grass cover, Good, HSG A	g, HSG A	ərage	ious Area	rvious Area	Slone Velocity Canacity Description	(cfs)	Direct Entry,
	iption	Grass cover, G	98 Paved parking, HSG A	Weighted Average	15.71% Pervious Area	84.29% Impervious Area	ocity Canacity	sec) (cfs)	
	sf) CN	38 3	23 98	61 89	38	23			
-	Area (11,3	60,823	72,161	11,338	60,823	To Length	(min) (f	0.9

Subcatchment DA-3a: DA-3a



Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment DA-3b: DA-3b

1.45 cfs @ 12.09 hrs, Volume= II

Runoff

4,429 cf, Depth> 5.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 50-Year Rainfall=7.42"

					Runoff	
			ry, 3b: DA-3b			14 15 16 17 18 19 20
CN Description 39 >75% Grass cover, Good, HSG A 98 Paved parking, HSG A	83 Weighted Average 25.21% Pervious Area 74.79% Impervious Area	Slope Velocity Capacity Description (ft/ft) (ft/sec) (cfs)	Direct Entry, Subcatchment DA-3h: DA-3h	Hydrograph	Type III 24-hr 50-Year Rainfall=7.42" Runoff Area=10,386 sf Runoff Volume=4,429 cf Tc=6.0 min CN=83	5 6 7 8 9 10 17 12 13 13 15 15 15 15 15 15 15 15 15 15 15 15 15
Area (sf) 2,618 7,768	10,386 2,618 7,768	Tc Length (min) (feet)	0.9		Type II 50-Yea 50-Yea Runoff Runoff CN=6.0	2 3 4

~	
œ	
а.	
_	
-	
_	
$\overline{}$	
0	
-	
6	
_	
.=	
=	
Ξ	
-	
•	
_	

Proposed Conditions
Type III 24-hr 50-Year Rainfall=7.42"
Printed 10/22/2020
5.LLC Page 41

Proposed Conditions
Type III 24-hr 50-Year Rainfall=7.42"
Printed 10/22/2020
5.LLC Page 42

Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Pond DET-1: Underground Detention System

Inflow Area =	II	72,161 sf,	, 84.29% In	npervious,	Inflow Depth > 5.80" for 50-Year event
Inflow	П	10.99 cfs @	12.09 hrs,	Volume=	34,879 cf
Outflow	II	4.16 cfs @	12.33 hrs,	Volume=	4.16 cfs @ 12.33 hrs, Volume= 33,904 cf, Atten= 62%, Lag= 14.7 min
Primary	II	4.16 cfs @	12.33 hrs,	Volume=	33,904 cf

Routing by Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 63.04' @ 12.33 hrs Surf.Area= 4,480 sf Storage= 10,410 cf

Plug-Flow detention time= 52.4 min calculated for 33.904 of (97% of inflow) Center-of-Mass det. time= 41.0 min (793.1 - 752.1)

/olume Invert Avail.Storage Storage Description	7,672 cf Oldcastle StormCapture SC1 3'x 24	Inside= 84.0 "W x 36.0 "H => 20.06 sf x 16.00 "L = 321.0 cf	Outside= 96.0 "W x 43.0"H => 28.67 sf x 16.00 "L = 458.7 cf	4 Rows adjusted for 32.0 cf perimeter wall	5,112 cf Oldcastle StormCapture SC1 3'x 16	Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf	Outside= 96.0 "W x 43.0"H => 28.67 sf x 16.00 "L = 458.7 cf	4 Rows adjusted for 24.0 of perimeter wall
Avail Storage	7,672 cf				5,112 cf			
nvert	.09.09				.09.09			
Volume	#1				42			

12,784 cf Total Available Storage

Invert Outlet Devices	60.60' 12.0" Round Culvert	L= 100.0' CMP, projecting, no headwall, Ke= 0.900	Inlet / Outlet Invert= 60.60' / 59.40' S= 0.0120 '/ Cc= 0.900	n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf	6.0" Vert. Orifice/Grate X 2.00 C= 0.600	Limited to weir flow at low heads	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir	Head (feet) 0.20 0.40 0.60 0.80 1.00	Coef (English) 2.80 2.92 3.08 3.30 3.32
Invert	.09.09				.09 09		62.60'		
Device Routing	#1 Primary				Device 1		#3 Device 1		
Device	#1				#5		#3		

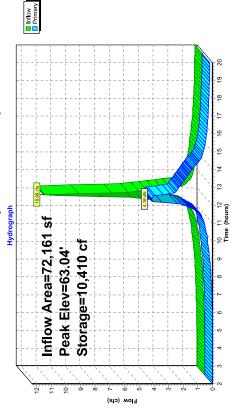
Primary OutFlow Max=4.16 cfs @ 12.33 hrs HW=63.04' (Free Discharge)

—1=Culvert (Inlet Controls 4.16 cfs @ 5.29 fps)

—2=Orifice/Grate (Passes < 2.80 cfs potential flow)
—3=Broad-Crested Rectangular Weir (Passes < 3.45 cfs potential flow)

Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC.

Pond DET-1: Underground Detention System



	Proposed Conditons
Arlington-PR Type III 24-hr	Type III 24-hr 50-Year Rainfall=7.42"
Prepared by Weston & Sampson	Printed 10/22/2020
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC	Page 43

Proposed Conditions
Type III 24-hr 50-Year Rainfall=7.42"
Printed 10/22/2020
5.LLC Page 44 Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Link POA-2: Grove Street

14,034 sf. 87.20% Impervious, Inflow Depth > 5.92" for 50-Year event 2.16 cfs @ 12.09 hrs, Volume= 6,918 cf. Atten= 0%, Lag= 0.0 min

Inflow Area = Inflow = Primary =

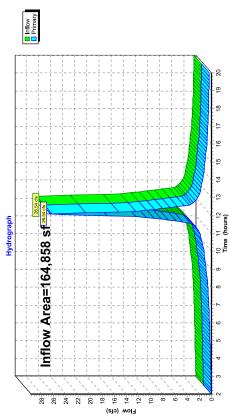
Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

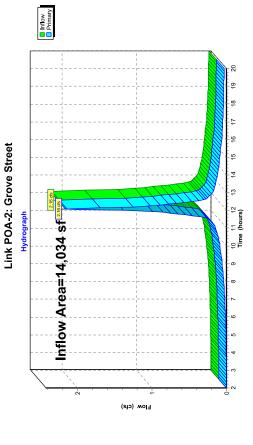
Summary for Link POA-1: Mill Brook

Inflow	89,264 cf	
164,858 sf, 94.89% Impervious,	26.54 cfs @ 12.09 hrs, Volume=	26.54 cfs @ 12.09 hrs, Volume=
Inflow Area =	lnflow =	Primary =

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-1: Mill Brook





Arlington-PR Prepared by Weston & Sampson	HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC
---	---

Proposed Conditions Type III 24-hr 50-Year Rainfall=7.42" Printed 10/22/2020

Page 45

82,547 sf, 83.09% Impervious, Inflow Depth > 5.57" for 50-Year event 4.92 cfs @ 12.22 hrs, Volume= 38,333 cf, Atten= 0%, Lag= 0.0 min

Inflow Area = Inflow = Primary =

Link POA-3: Arlington High School

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Summary for Link POA-3: Arlington High School

Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Arlington-PR

Proposed Conditons Type III 24-hr 100-Year Rainfall=8.89" Printed 10/22/2020

Page 46

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Runoff Area=164,858 sf 94.89% Impervious Runoff Depth>7.89" Tc=6.0 min CN=95 Runoff=31.95 cfs 108,432 cf SubcatchmentDA-1: DA-1

Runoff Area=14,034 sf 87.20% Impervious Runoff Depth>7.30" Tc=6.0 min CN=90 Runoff=2.63 cfs 8,535 cf SubcatchmentDA-2: DA-2

Runoff Area=72,161 sf 84.29% Impervious Runoff Depth>7.18" Tc=6.0 min CN=89 Runoff=13.41 cfs 43,163 cf

SubcatchmentDA-3a: DA-3a

Runoff Area=10,386 sf 74.79% Impervious Runoff Depth>6.46" Tc=6.0 min CN=83 Runoff=1.80 cfs 5,588 cf

SubcatchmentDA-3b: DA-3b

Peak Elev=63.73' Storage=12,784 cf Inflow=13.41 cfs 43,163 cf Outflow=4.85 cfs 42,091 cf Pond DET-1: Underground Detention

Link POA-1: Mill Brook

Link POA-2: Grove Street

Inflow=2.63 cfs 8,535 cf Primary=2.63 cfs 8,535 cf

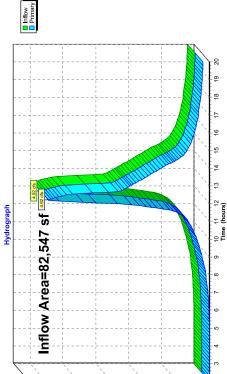
Inflow=31.95 cfs 108,432 cf Primary=31.95 cfs 108,432 cf

Inflow=6.01 cfs 47,679 cf Primary=6.01 cfs 47,679 cf

Link POA-3: Arlington High School

Total Runoff Area = 261,439 sf Runoff Volume = 165,717 cf Average Runoff Depth = 7.61" 9.24% Pervious = 24,169 sf 90.76% Impervious = 237,270 sf

Flow (cfs)



Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditions
Type III 24-hr 100-Year Rainfall=8.89"
Printed 10/22/2020
IS LLC Page 47

Proposed Conditions Type III 24-hr 100-Year Rainfall=8.89" Printed 10/22/2020

Page 48

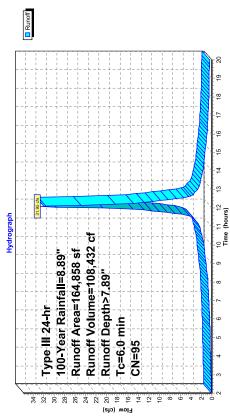
Summary for Subcatchment DA-1: DA-1

108,432 cf, Depth> 7.89" 31.95 cfs @ 12.09 hrs, Volume= Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.89"

Area (st) CN Description Cares cover, Good, HSG A Cares C	Tc Length Slope Velocity Capacity Description (min) (feet) (ft/ft) (ft/sec) (cfs)	6.0 Direct Entry,
--	---	-------------------

Subcatchment DA-1: DA-1



Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment DA-2: DA-2

8,535 cf, Depth> 7.30"

2.63 cfs @ 12.09 hrs, Volume= II Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.89"

						■ Runoff		
							F≈	
							Ęę	
							₽	
							+=	
				,	7		16	
					Š		, 15	
			_	برخ	.;		13 14	
	SG A		riptio	Direct Entry,	ב ב			_
	d, H	, a	Description	Dire	mer raph	No.	\[\frac{1}{2}\]	Time (hours)
	, God	Area s Are		:	Subcatchment DA-Z: DA-Z Hydrograph		, [e	Time
	cover g, HS	erage ous A rvious	Sapa (c	-	on "	0. 34 £ 8.8 0.	6	
ioi	>75% Grass cover, Good, HSG A Paved parking, HSG A	Weighted Average 12.80% Pervious Area 87.20% Impervious Area	Slope Velocity Capacity (ft/ft) (ft/sec) (cfs)		n	fall: -7.3	€ ∞	
Description	5% G	ighte 80% 20%	Velocity (ft/sec)			othy	-	
De	>7.5 Pa	We 12 87	lope (ft/ft)			Are Are II R	9	
S	39 88	06	S ⊕			00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	co.	
st)	96 38	34 96 38	ength (feet)			Type III 24-hr 100-Year Rainfall=8.89" Runoff Area=14,034 sf Runoff Volume=8,535 cf Runoff Depth>7.30" Tc=6.0 min CN=90	4	
Area (sf)	1,796 12,238	14,034 1,796 12,238	_				η σ	
4			Tc (min)	0.9		Flow (cfs)	1,0	
			_	1		(1977) 1117		

Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditions
Type III 24-hr 100-Year Rainfall=8.89"
Printed 10/22/2020
Is LLC Page 49

Proposed Conditions Type III 24-hr 100-Year Rainfall=8.89" Printed 10/22/2020

Page 50

5,588 cf, Depth> 6.46"

1.80 cfs @ 12.09 hrs, Volume=

Runoff

Summary for Subcatchment DA-3b: DA-3b

Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment DA-3a: DA-3a

43,163 cf, Depth> 7.18" 13.41 cfs @ 12.09 hrs, Volume= Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.89"

Area (sf) CN Description	39 >75% Grass cover, Good, HSG A	98 Paved parking, HSG A	89 Weighted Average	15.71% Pervious Area	84.29% Impervious Area	Slope Velocity Capacity Description	(ft/ft)	Direct Entry,
Area (sf)	11,338	60,823	72,161	11,338	60,823	Tc Lenath	(min) (feet)	0.9

Subcatchment DA-3a: DA-3a

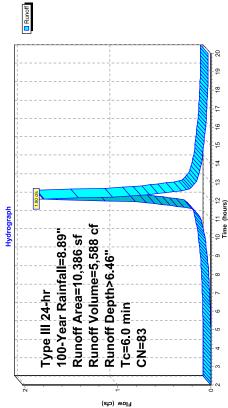
19 17 9 -5 10 11 12 Time (hours) Runoff Volume=43,163 cf 100-Year Rainfall=8.89" Runoff Area=72,161 sf Runoff Depth>7.18" Type III 24-hr Tc=6.0 min CN=89 4 13 12 7 10-

Flow (cfs)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.89" >75% Grass cover, Good, HSG A Paved parking, HSG A Weighted Average 25.21% Pervious Area 74.79% Impervious Area Description S 88 83 2,618 7,768 10,386 2,618 7,768 Area (sf)

Direct Entry, Velocity Capacity Description (ft/sec) (cfs) Slope (ft/ft) Length (feet) Tc (min.)

Subcatchment DA-3b: DA-3b



Proposed Conditions
Type III 24-hr 100-Year Rainfall=8.89"
Printed 10/22/2020
IS LLC Page 51

Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditions

Type III 24-hr 100-Year Rainfall=8.89"

Printed 10/22/2020
ns LLC

Page 52

Summary for Pond DET-1: Underground Detention System

Inflow Area =	 	72,161 sf,	84.29% In	npervious,	Inflow Depth >	72,161 sf, 84.29% Impervious, Inflow Depth > 7.18" for 100-Year event	+
Inflow	П	13.41 cfs @	12.09 hrs,	Volume=	43,163 of		
Outflow	П	4.85 cfs @ 12.35 hrs, Volume=	12.35 hrs,	Volume=	42,091 cf	42,091 cf, Atten= 64%, Lag= 15.8 min	min
Primary	П	4.85 cfs @	12.35 hrs.	Volume=	42,091 cf		

Routing by Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Peak Elev= $63.73' \otimes 12.35$ hrs Storage= 12.784 cf

Plug-Flow detention time=50.7 min calculated for 41,975 of (97% of inflow) Center-of-Mass det. time=40.5 min (787.6 - 747.1)

		L = 321.0	00'L = 458			$^{1}L = 321.0 c$	00'L = 458.7	
Volume Invert Avail.Storage Storage Description	7,672 cf Oldcastle StormCapture SC1 3'x 24	Inside= 84.0 "W x 36.0 "H => 20.06 sf x 16.00 "L = 321.0 cf	Outside= 96.0 "W x 43.0"H => 28.67 sf x 16.00 "L = 458.7 cf	4 Rows adjusted for 32.0 cf perimeter wall	5,112 cf Oldcastle StormCapture SC1 3'x 16	Inside= 84 0"W x 36 0"H => $20.06 \text{ sf x } 16.00 \text{L} = 321.0 \text{ cf}$	Outside= 96.0 "W x 43.0"H => 28.67 sf x 16.00 "L = 458.7 cf	4 Rows adjusted for 24 0 of perimeter wall
Avail.Storage	7,672 cf				5,112 cf			
Invert	.09'09				.09.09			
Volume	#1				#2			

12,784 cf Total Available Storage

Invert Outlet Devices	60.60' 12.0" Round Culvert	L= 100.0' CMP, projecting, no headwall, Ke= 0.900	Inlet / Outlet Invert= 60.60' / 59.40' S= 0.0120 '/' Cc= 0.900	n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf	6.0" Vert. Orifice/Grate X 2.00 C= 0.600	Limited to weir flow at low heads	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir	Head (feet) 0.20 0.40 0.60 0.80 1.00	Coef. (English) 2.80 2.92 3.08 3.30 3.32
Invert	.09.09				.09 09		62.60		
Device Routing	#1 Primary				Device 1		Device 1		
Device	#				#2		#3		

Primary OutFlow Max=4.84 cfs @ 12.35 hrs HW=63.73' (Free Discharge)

—1=Culvert (Inlet Controls 4.84 cfs @ 6.17 fps)

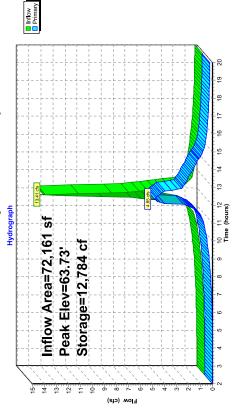
—2=Orifice/Grate (Passes < 3.21 cfs potential flow)

—3=Broad-Crested Rectangular Weir (Passes < 16.02 cfs potential flow)

Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Pond DET-1: Underground Detention System





Proposed Conditions

Type III 24-hr 100-Year Rainfall=8.89"

Printed 10/22/2020
ns LLC

Page 53 Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Proposed Conditions
Type III 24-hr 100-Year Rainfall=8.89"
Printed 10/22/2020
ns LLC
Page 54

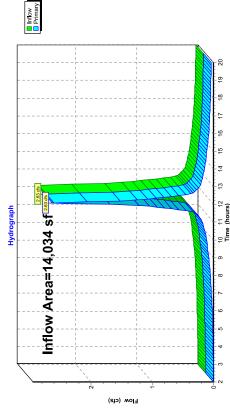
Arlington-PR
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Summary for Link POA-2: Grove Street

14,034 sf. 87.20% Impervious, Inflow Depth > 7.30" for 100-Year event 2.63 cfs @ 12.09 hrs, Volume= 8,535 cf, Atten= 0%, Lag= 0.0 min Inflow Area = $\Pi = \Pi$ Inflow Primary

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-2: Grove Street

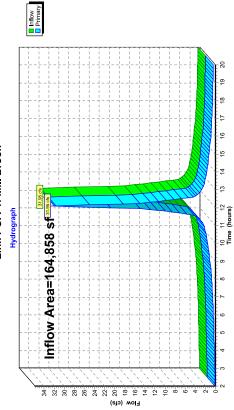


Summary for Link POA-1: Mill Brook

164.858 sf, 94.89% Impervious, Inflow Depth > 7.89" for 100-Year event 31.95 cfs @ 12.09 hrs, Volume= 108,432 cf, Atten= 0%, Lag= 0.0 min Inflow Area = Inflow = Primary =

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-1: Mill Brook



Affington-PR
Propaged Conditions

Summary for Link POA-3: Adington High School
Inflow Area = 8.2547 st 69 ct, Atlane Cff; Lag= 0.0 min
Primary outflow = Inflow Area=82.547 st from the poart of the poart

APPENDIX C



Project: Arlington DPW

Location: 51 Grove Street, Arlington, MA

Prepared by: Elena Compter

Purpose: To calculate the water quality flow rate (WQF) over a given site area.

References: MassDEP Wetlands Program/Unites States Department of Agriculture Natural

Resources Conservation Service TR-55 Manual

<u>Given</u>

Structure	Impervious	Α	Tc	Tc	WQV
Name	(Acres)	(miles²)	(min)	(hr)	(in)
SWTU-1	0.906	0.0014158	6	0.1	1
SWTU-2	0.030	4.721E-05	6	0.1	1
SWTU-3	0.406	0.0006346	6	0.1	1
SWTU-4	0.570	0.0008904	6	0.1	1
SWTU-5	0.190	0.0002974	6	0.1	1

Procedure: Determine unit peak discharge(qu) using Figure 1 or 2 contained the

reference material. Using the Tc, read the unit peak disharge (qu) from Table in Figure 2. qu is expressed in the following units:

cfs/mi²/watershed inches (csm/in).

_		
	Structure	Impervious
	Name	(Acres)
	SWTU-1	774
	SWTU-2	774
	SWTU-3	774
	SWTU-4	774
	SWTU-5	774

1. Compute Q Rate using the following equation:

Q= (qu) (A) (WQV)

where: q = flow rate associated with the first 1" of runoff

qu = the unit peak discharge, in csm/in

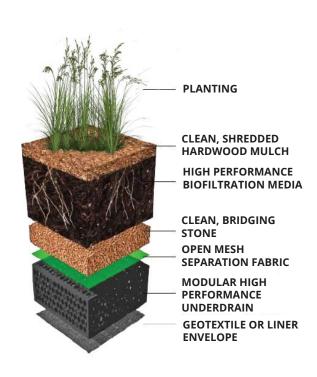
A = impervious surface drainage area (in square miles)

WQV = water quality volume in watershed inches (1.0" in this case)

Structure	0
Structure	Ų
Name	(cfs)
SWTU-1	1.096
SWTU-2	0.037
SWTU-3	0.491
SWTU-4	0.689

HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM FOR FILTRATION OF STORMWATER

FocalPoint is an ultra-efficient, modular biofiltration system that treats and drains large volumes of stormwater runoff in a small footprint to meet post-construction stormwater treatment requirements. The biofiltration system utilizes the physical, chemical and biological mechanisms of a soil, plant and microbe complex to remove pollutants typically found in urban stormwater runoff. The system can be installed along the edge of a roadway behind curb lines, in landscaped stormwater basins and can be incorporated into an urban green infrastructure streetscapes. Infiltration flow rates for the system's standard media exceed 100" per hour. It is a complete, integrated system with a demanding specification that ensures functionality, performance and maintainability.









ADVANTAGES:

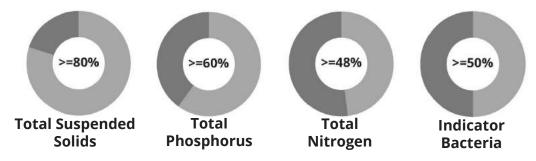
- Gain usable square footage
- Reduce material requirements and cost
- Improve property aesthetic and value
- 100"+ per hour infiltration rate

- Treat the same amount of water in <10% of the area required for traditional bioretention
- ACF provides 1st year of maintenance on system



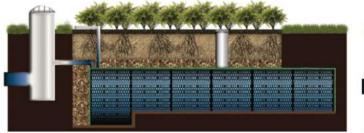
POLLUTANT REMOVAL

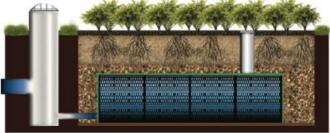
FocalPoint achieves pollutant removal rates consistent with traditional bioretention, and the option of increased removal characteristics for specific pollutant targets. The system is 3rd party field tested under TAPE (Technology Assessment Protocol – Ecology), independently field tested by the North Carolina State University, and has numerous agencies' approvals that meet state water quality standards for post construction BMPs.



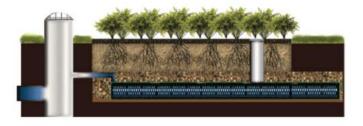
MODULAR UNDERDRAIN

FocalPoint's modular open cell underdrain system, unlike traditional underdrains, not only supports the flow rate of the media, but can be expanded beyond the footprint of the media bed to provide unlimited underground detention, infiltration and/or storage for water reuse. This can help meet channel protection, infiltration and flood control requirements.





R-Tank underdrain can be extended beyond FocalPoint footprint as shown above





ACCESSORY PRODUCTS



Beehive Overflow Filter Riser for collection of gross solids during major storm events



Rain Guardian Turret for curbline pretreatme நூற்ற அழிகு ஒரு dissipation

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

- 1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
- 2. Select BMP from Drop Down Menu
- 3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: Upper Site Treatment Train

		В	С	D	E	F
		BMP ¹	TSS Removal Rate ¹	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
	neet	Street Sweeping - 5%	0.05	1.00	0.05	0.95
Removal	Worksheet	Deep Sump and Hooded Catch Basin	0.25	0.95	0.24	0.71
Re	on	Oil Grit Separator	0.25	0.71	0.18	0.53
TSS	culati		0.00	0.53	0.00	0.53
	Calcı		0.00	0.53	0.00	0.53

Total TSS Removal =

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Arlington DPW
Prepared By: Elena Compter
Date: 10/20/2020

*Equals remaining load from previous BMP (E) which enters the BMP

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

- 1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
- 2. Select BMP from Drop Down Menu
- 3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: Parking Lot Treatment to Focal Point

	В	С	D	Е	F
		TSS Removal	Starting TSS	Amount	Remaining
	BMP ¹	Rate ¹	Load*	Removed (C*D)	Load (D-E)
neet	Street Sweeping - 5%	0.05	1.00	0.05	0.95
Removal ion Worksheet	Sediment Forebay	0.25	0.95	0.24	0.71
Rem on W	Rain Garden	0.90	0.71	0.64	0.07
TSS ReCalculation		0.00	0.07	0.00	0.07
Cal		0.00	0.07	0.00	0.07
					Separate Form Needs to be Completed for Each

Total TSS Removal =

93%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Arlington DPW
Prepared By: Elena Compter
Date: 10/20/2020

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed 1. From MassDEP Stormwater Handbook Vol. 1

APPENDIX D



Because several hazardous fluids, including, but not limited to, waste oil, anti-freeze, hydraulic oil, and motor oil is proposed for storage on the site, a Spill Prevention Control and Countermeasures (SPCC) Plan will be required for the Site in accordance with EPA requirements. This plan will be provided following construction and prior to use of the facility. To meet the requirements of Standard 4 of the Massachusetts Stormwater Handbook, this Long-Term Pollution Prevention Plan is provided to identify the proper procedures of practices for source control and pollution prevention.

STORAGE AND HANDLING OF OIL AND OTHER HAZARDOUS MATERIALS

All oil products and other hazardous materials stored in quantities greater than or equal to 55 gallons will be stored in double walled tanks or provided with other means of secondary containment. The SPCC Plan will detail the spill containment and response actions that will be implemented in the event of a spill.

The handling/use of oil and vehicle maintenance fluids will be conducted in the vehicle maintenance and/or shop area of the facility, which will be equipped with floor drains connected to an oil/gas/sand separator prior to discharge to the sewer.

VEHICLE STORAGE AND WASHING

Vehicles will be stored within the building or under the building canopy. Areas under cover or out in the open will be monitored for any potential contamination to the infiltration system or resource areas. Vehicle washing will be performed in the vehicle wash bay of the facility. Wash water will be collected by floor drains located within the wash bay and will be discharged to the sewer.

OPERATION AND MAINTENANCE OF STORMWATER CONTROL STRUCTURES

Included in this Appendix is the Operation and Maintenance plan for this site, which includes street sweeping of the paved areas and periodic removal of sediment from catch basins and other stormwater structures. The Department of Public Works will be responsible for the implementation of the plan.

MATERIAL STORAGE AREA

The material storage areas will be inspected and maintained, as required, to prevent erosion or any potential contamination to the infiltration system or resource areas.

SALT STORAGE AND LOADING

Salt will be stored inside the proposed salt shed. All salt deliveries to the site will be unloaded directly inside the salt shed to eliminate salt spills. A salt loading ramp will be constructed at the entrance to the salt shed to give an elevated platform during the salt loading. The salt loading ramp will help to eliminate spills during loading of salt into DPW vehicles. During storm events, the operator of the front end loader, used to load the vehicles, will periodically inspect the truck loading area to see if any salt product was spilled during loading operations. In the event excess salt product is observed, the operator shall immediately collect the excess product and transport it back into the salt shed.



LANDSCAPING

The landscaped areas will be maintained by the Department of Public Works. No fertilizers will be stored or used on site.

PET WASTE MANAGEMENT

It is not expected that pets will be accessing the facility; therefore, it is not necessary to design to manage pet waste.

WASTEWATER SYSTEM

Wastewater will be generated in the building. The building will be tied into the Town's sewer system, so there will be no onsite septic facilities.

DE-ICING & SNOW DISPOSAL

The DPW intends to utilize salt and sand to treat the paved surfaces of the driveways and main circulation areas during snow and ice events. Salt will be stored inside the proposed salt shed on site. Snow storage will consist of pushing snow into grassed areas along the perimeter of the property.

GOOD HOUSEKEEPING MEASURS

The DPW will implement good housekeeping measures to prevent any pollutants generated by the activities on site from entering surface waters and/or groundwater. These measures will include developing and following SPCC plan, maintaining stormwater BMP in accordance with O&M Plan to ensure optimal operation of stormwater BMPs, and following requirements of LTPPP plan as outline above.



Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan

Department of Public Works 51 Grove Street, Arlington MA

Inspection Form

Inspected	l By:		Date:	Time:
YES	NO	DOES NOT APPLY		ITEM
			Do any erosion/siltation cont out to maintain adequate fur	rol measures require repair or cleanction?
			Is there any evidence that se entering the wetlands?	ediment is leaving the site and
			located in non-approved are	
			Are on-site construction traff equipment and supplies locatesigned for them?	ic routes, parking, and storage of ated in areas not specifically
Specific lo	ocation, c	current weather con	nditions, and action to be	taken:
Other Cor	mments:			
Pending	the action	ons noted above	I certify that the site	is in compliance with the
Construct	ion Perio	d Pollution Prevent	ion and Erosion and Sed	imentation Control Plan.
Signature	· ·		Date:	

.....



westonandsampson.com 598 of 842

SECTION I – PURPOSE/INTENT

The purpose of this document is to provide for the health, safety, and general welfare of the citizens of Arlington, Massachusetts through the regulation of non-stormwater discharges into existing outstanding resource areas near the proposed public works facility site to the maximum extent practicable, as required by federal and state law. This document establishes methods for controlling the introduction of pollutants into existing outstanding resource areas to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process.

SECTION II - DEFINITIONS

For the purposes of this statement, the following shall mean:

Best Management Practices (BMPs): Schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

Clean Water Act: The federal Water Pollution Control Act (33 U.S.C § 1251 et seq.), and any subsequent amendments thereto.

Construction Activity: Activities subject to the Massachusetts Erosion and Sedimentation Control Act or NPDES Construction Permits. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.

Hazardous Materials: Any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Illegal Connection: An illegal connection is defined as either of the following:

- a. Any pipe, open channel, drain or conveyance, whether on the surface or subsurface, which allows an illicit discharge to enter the outstanding resource area including but not limited to any conveyances which allow any non-stormwater discharge including sewage, process wastewater, and wash water, regardless of whether said drain or connection has been previously allowed, permitted, or approved by an authorized enforcement agency; or
- b. Any pipe, open channel, drain or conveyance connected to the Town of Arlington storm water treatment system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.

Illicit Discharge: Any direct or indirect non-stormwater discharge to the Town of Arlington stormwater treatment system, except as exempted in Section II of this ordinance.



Industrial Activity: Activities subject to NPDES Industrial Permits as defined in 40CFR, Section 122.26 (b) (14).

National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge Permit: A permit issued by MassDEP under authority delegated pursuant to 33 USC § 1342 (b) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

Town of Arlington Stormwater Treatment System: Any facility, owned or maintained by the town, designed or used for collecting and/or conveying stormwater, including but not limited to roads with drainage systems, Town of Arlington streets, curbs, gutters, inlets, catch basins, piped storm drains, pumping facilities, infiltration, retention and detention basins, natural and man-made or altered drainage channels, reservoirs, and other drainage structures.

Non-Stormwater Discharge: Any discharge to the storm drain system that is not composed entirely of stormwater.

Person: Any individual, association, organization, partnership, firm, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, city, county or other political subdivision of the State, interstate body, or any other legal entity.

Pollutant: Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; petroleum hydrocarbons; automotive fluids; cooking grease; detergents (biodegradable or otherwise); degreasers; cleaning chemicals; non-hazardous liquid and solid wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; liquid and solid wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; concrete and cement; and noxious or offensive matter of any kind.

Pollution: Contamination or other alteration of any water's physical, chemical, or biological properties by addition of any constituent including but not limited to a change in temperature, taste, color, turbidity, or odor of such waters, or the discharge of any liquid, gaseous, solid, radioactive, or other substance into any such waters as will or is likely to create a nuisance or render such waters harmful, detrimental, or injurious to the public health, safety, welfare, or environment, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other aquatic life.

Premises: Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

Stormwater: Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation and resulting from such precipitation.

Wastewater: Any water or other liquid discharged from a facility, that has been used, as for washing, flushing, or in a manufacturing process, and so contains waste products.



SECTION III - PROHIBITIONS

Prohibition of Illicit Discharges:

No person shall throw, drain, or otherwise discharge, cause or allow others under its control to throw, drain, or otherwise discharge into the Town of Arlington stormwater treatment system or watercourses any materials, including but not limited to, any pollutants or waters containing any pollutants, other than stormwater. The commencement, conduct, or continuance of any illicit discharge to the storm drain system is prohibited except as described as follows:

- 1. Water line flushing performed by a government agency, other potable water sources, landscape irrigation or lawn watering, diverted stream flows, rising ground water, ground water infiltration to storm drains, uncontaminated pumped ground water, foundation or footing drains (not including active groundwater dewatering systems), crawl space pumps, air conditioning condensation, springs, natural riparian habitat or wetland flows, and any other water source not containing pollutants;
- 2. Discharges or flows from firefighting, and other discharges specified in writing by the Town of Arlington as being necessary to protect public health and safety;
- 3. Dye testing is an allowable discharge, but requires a verbal notification to the Town of Arlington prior to the time of the test;
- 4. Any non-stormwater discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for a discharge to the Town of Arlington stormwater treatment system.

SECTION IV - INDUSTRIAL OR CONSTRUCTION ACTIVITY DISCHARGES

Any person subject to an industrial or construction activity NPDES stormwater discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the Town of Arlington Department of Public Works prior to allowing discharges to the Arlington stormwater treatment system.

SECTION V - NOTIFICATION OF SPILLS AND ACCIDENTAL DISCHARGES

Notwithstanding other requirements of law, as soon as any person responsible for a facility, activity or operation, or responsible for emergency response for a facility, activity or operation has information of any known or suspected release of pollutants or non-stormwater discharges from that facility, activity, or operation which are resulting or may result in illicit discharges or pollutants discharging into stormwater, the Town of Arlington stormwater treatment system, State Waters, or Waters of the U.S., said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release so as to minimize the effects of the discharge. In the event of such a release of hazardous materials, said person shall immediately notify emergency response agencies



ILLICIT DISCHARGE COMPLIANCE STATEMENT

TOWN OF ARLINGTON

of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the Town of Arlington Department of Public Works in person or by phone no later than the next business day, including the nature, quantity and time of occurrence of the discharge. Notifications in person or by phone shall be confirmed by written notice, via certified mail return receipt requested addressed to the Town of Arlington Department of Public Works within three (3) business days of the initial notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

IN WITNESS WHEREOF the parties he	ereto have executed copies of this Agreement on the
day of,,	
Michael Rademacher, Director	
Department of Public Works	

Operation and Maintenance Plan

Arlington Public Works Facility



SECTION 1 – INTRODUCTION

The following document has been written to comply with the stormwater guidelines set forth by the Massachusetts Department of Environmental Protection (MassDEP). The intent of these guidelines is to encourage Low Impact Development techniques to improve the quality of the stormwater runoff. These techniques, also known as Best Management Practices (BMPs) collect, store, and treat the runoff before discharging to adjacent environmental resources.

SECTION 2 - PURPOSE

This Operation and Maintenance Plan (O&M Plan) is intended to provide a mechanism for the consistent inspection and maintenance of each BMP installed on the project site. Included in this O&M Plan is a description of each BMP type and an inspection form for each BMP. The Town of Arlington is the owner and operator of the system and is responsible for its upkeep and maintenance. This work will be funded on an annual basis through the Town's operating budget. The estimated budget to maintain these BMPs utilizing the Department of Public Works workforce and equipment is approximately \$15,000 per year. This budget assumes that Town equipment will be utilized, and no additional equipment rental is required.

In the event the Town sells the property, it is the Town's responsibility to transfer this plan, as well as the past three years of operation and maintenance records, to the new property owner.

SECTION 3 – BMP DESCRIPTION AND LOCATIONS

3.1 Street Sweeping

Street sweeping consists of using a street sweeping machine to clean impervious areas of accumulated sediment, debris, and trash at the parking areas surrounding the public works facility.

3.2 Deep Sump Catch Basins

Deep sump catch basins will be located throughout the site and used as pre-treatment before entering the hydrodynamic separators. The deep sump catch basins are collection systems that are designed to remove trash, debris, and coarse sediment from the stormwater runoff.

3.3 Stormwater Treatment Structures

There are four stormwater treatment structures on site. These structures are hydrodynamic separators, designed to slow stormwater down and allow oil and debris to rise and sediment to settle out.

SECTION 4 - INSPECTION, MAINTENANCE, AND SCHEDULE

4.1 Street Sweeping



Street sweeping shall be performed on the proposed parking lot and driveway areas on a monthly average, primarily in the spring and fall. Street sweeping shall be performed using an appropriate street sweeping machine.

In the event of contamination by a spill or other means, all street sweeping cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000 and handled as hazardous waste.

In the absence of evidence of contamination, street sweeping cleanings may be taken to a landfill or other facility permitted by MassDEP to accept Solid Waste without any prior approval by MassDEP. Please note that current MassDEP regulations prevent landfills from accepting materials that contain free-draining liquids.

4.2 Deep Sump Catch Basins

Inspect and/or clean catch basins at least four times per year and at the end of foliage and snow removal seasons. Sediments must be removed whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin. Each catch basin should be cleaned a minimum of four times per year regardless of the amount of sediment in the basin. They shall be cleaned using clamshell buckets or vacuum trucks.

In the event of contamination by a spill or other means, all cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000 and handled as hazardous waste.

In the absence of evidence of contamination, catch basin cleanings may be taken to a landfill or other facility permitted by MassDEP to accept Solid Waste without any prior approval by MassDEP. Please note that current MassDEP regulations prevent landfills from accepting materials that contain free-draining liquids.

4.3 Knockdown Area

The catch basin in the center of knockdown area shall be visually inspected on bi-weekly basis for sediment accumulation. Sediment must be removed according to procedure outlined in Section 4.2 of this report whenever the depth of sediment reaches high point between the bottom of the sump and invert of the pipe.

4.4 Stormwater Treatment Structures

Stormwater treatment structures shall be inspected every six months for the first year. Following the first year, the structures can be inspected a minimum of once per year or as first year data indicates. After a hazardous spill, structures shall be inspected immediately. The structures shall be cleaned a minimum of once per year or when the sediment depth is 15% of its capacity. Polluted water, sediments, and debris should be disposed of in accordance with local, state, and federal regulations.



4.6 Inspections and Record Keeping

- An inspection form should be filled out every time maintenance work is performed.
- A binder should be kept at the Public Works Facility that contains all the completed inspection forms and any other related materials.
- A review of all Operation & Maintenance actions should take place annually to ensure that these Stormwater BMPs are being taken care of in the manner illustrated in this Operation & Maintenance Plan.
- All operation and maintenance log forms for the last three years, at a minimum, shall be kept on site at the Public Works Facility.

The inspection and maintenance schedule may be refined in the future based on the findings and results of this operation and maintenance program or policy.



Street Sweeping

Frequency:	Monthly, primarily in the spring and fall.
Location:	Parking Lots and Driveways
Inspected By:	Date:
Observations:	
Actions Taken:	
Instructions:	Sweep parking lots and driveways using street sweeping machine. All trash, debris, and sediments should be disposed of in accordance with local, state, and federal regulations.

Deep Sump Catch Basins

Frequency:	Inspect and clean deep sump catch basins at least for times per year and at the end of foliage and snow remove seasons.
Structure Number:	
Inspected By:	Date:
Observations:	
Actions Taken:	
Instructions:	Clean units four times per year or whenever the depth of th deposits is greater than or equal to one half the depth from the bottom of the invert to the lowest pipe in the structure.

Stormwater Treatment Structure

Frequency:	Inspect every six months for the first year and as necessary following the first year. After a hazardous spill, structures shall be inspected immediately.
Structure Number:	
Inspected By:	Date:
Observations:	
Actions Taken:	
Instructions:	Clean unit when the sediment depth is 15% of its capacity Dispose of sediment and debris in accordance with local state, and federal laws.

Knockdown Area

Frequency:	Inspect catch basin in the center of knockdown area at least bi-weekly or more frequently as necessary based on the use of the knockdown area.
Structure Number:	
Inspected By:	Date:
Observations:	
Actions Taken:	
Instructions:	Clean catch basin at least four times per year or whenever the depth of the deposits is greater than or equal to one half the depth from the bottom of the invert to the lowest pipe in the structure.

Appendix D

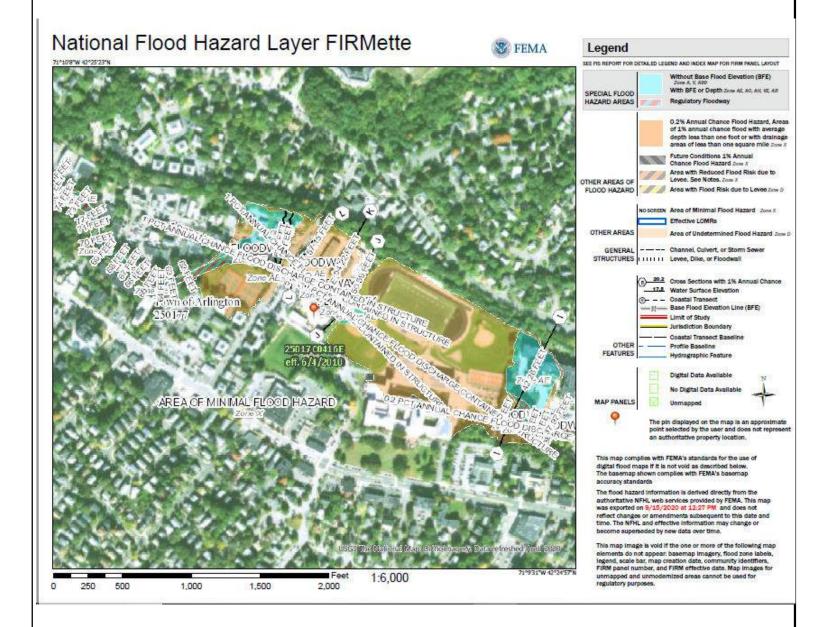


FIGURE 3

DPW Facility Arlington, MA

FEMA Map



Appendix E

SECTION 01562

DUST CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION:

This section of the specification covers the control of dust via water, complete.

PART 2 - PRODUCTS

2.01 WATER:

A. Water shall not be brackish and shall be free from oil, acid, and injurious alkali or vegetable matter.

PART 3 - EXECUTION

3.01 APPLICATION:

- A. Water may be sprinkler applied with equipment including a tank with gauge-equipped pressure pump and a nozzle-equipped spray bar.
- B. Water shall be dispersed through the nozzle under a minimum pressure of 20 pounds per square inch, gauge pressure.

END OF SECTION

\\wse03.local\\WSE\Projects\MA\Arlington, MA\DPW Facility\Permitting\Conservation\\NOI\Appendix E Specs\SECTION 01562-Dust Control.docx

07/12/2012 01562-1

SECTION 01570

ENVIRONMENTAL PROTECTION

PART 1 – GENERAL

1.01 DESCRIPTION:

- A. The work covered by this section of the specifications consists of furnishing all labor, materials, tools and equipment and performing all work required for the prevention of environmental pollution during and as a result of construction operations under this contract.
- B. The requirements set forth in this section of the specifications apply to construction in and adjacent to wetlands, unless otherwise specifically stated.
- C. All work under this Contract shall be in accordance with the Conservation Commissions' Orders of Conditions as well as any conditional requirements applied, all of which are attached to Section 00890, PERMITS.
- D. Prior to commencement of work, the Contractor shall meet with representatives of the Engineer to develop mutual understandings relative to compliance of the environmental protection program.

1.02 SUBMITTALS:

A. The Contractor shall submit for approval six sets of details and literature fully describing environmental protection methods to be employed in carrying out construction activities within 100 feet of wetlands or across areas designated as wetlands.

PART 2 - PRODUCTS

2.01 SILT FENCE:

- A. The silt fence shall consist of a 3-foot wide continuous length sediment control fabric, stitched to a mesh backing, and stapled to preweathered oak posts installed as shown on the drawings. The oak posts shall be 1-1/4-inches by 1-1/4-inches (Minimum Dimension) by 48-inches and shall be tapered. The bottom edge of the silt fence shall be buried as shown on the drawings.
- B. The silt fence shall be DOT Silt Fence PPDM3611, as manufactured by U.S. Silt & Site Supply/Getsco, Concord, NH, or approved equal.

C. Silt fence properties:

Physical Properties	<u>Test Method</u>	Minimum Value
Grab Strength, lbs.	ASTM-D-4632	124
Grab Elongation, %	ASTM-D-4632	15

Mullen burst, psi	ASTM-D-3786	300
Puncture, lbs.	ASTM-D-4833	65
Trapezoidal Tear, lbs.	ASTM-D-4833	65
UV Resistance2, %3	ASTM-D-4355	80@500 hrs.
AOS, US Sieve No.	ASTM-D-4751	30
Flow Rate, gal/min/sq ft	ASTM-D-4491	10
Permittivity, (1/sec) gal/min/sq ft	ASTM-D-4491	0.05 sec ⁻¹

2.02 STRAW BALES:

A. Straw bales shall consist of certified seed free stems of agricultural grain and cereal crops and shall be free of grasses and legumes. Standard bales shall be 14-inches high, 18- inches wide and 36- to 40-inches long tied with polypropylene twine and weigh within 5 percent of 7 lbs. per cubic ft.

2.03 CATCH BASIN PROTECTION:

A. To trap sediment and to prevent sediment from clogging drainage systems, catch basin protection in the form of a siltation sack (Siltsack as manufactured by ACF Environmental, Inc. or approved equal) shall be provided as approved by the Engineer.

2.04 COMPOST FILTER TUBES:

A. Silt socks shall be a tubular filter sock of mesh fabric. The fabric will have openings of between 1/8" to 1/4" diameter. The mesh material will either photo degrade within one year or be made of nylon with a life expectancy of 24 months. The sock shall be filled with a mix of composted leaf mulch, bark mulch and wood chips that have been composted for at least one year. The sock will have a minimum diameter of 12-inches.

PART 3- EXECUTION

3.01 NOTIFICATION AND STOPPAGE OF WORK:

A. The Engineer will notify the Contractor in writing of any non-compliance with the provisions of the Order of Conditions. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails to act promptly, the Owner may order stoppage of all or part of the work through the Engineer until satisfactory corrective action has been taken. No claim for an extension of time or for excess costs or damage incurred by the Contractor as a result of time lost due to any stop work orders shall be made unless it was later determined that the Contractor was in compliance.

3.02 AREA OF CONSTRUCTION ACTIVITY:

A. Insofar as possible, the Contractor shall confine his construction activities to those areas defined by the plans and specifications. All land resources within the project boundaries

and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction at least equal to that which existed prior to work under this contract.

3.03 PROTECTION OF WATER RESOURCES:

- A. The Contractor shall not pollute streams, lakes or reservoirs with fuels, oils, bitumens, calcium chloride, acids or other harmful materials. It is the Contractor's responsibility to comply with all applicable Federal, State, County and Municipal laws regarding pollution of rivers and streams.
- B. Special measures should be taken to insure against spillage of any pollutants into public waters.

3.04 CONSTRUCTION IN AREAS DESIGNATED AS WETLANDS ON THE DRAWINGS:

- A. Insofar as possible, the Contractor shall make every effort to minimize disturbance within areas designated as wetlands or within 100-feet of wetland resource areas.
- B. The Contractor shall perform his work in such a way that these areas are left in the condition existing prior to construction.
- C. The elevations of areas designated as wetlands shall not be unduly disturbed by the Contractor's operations.

3.05 LOCATION OF STORAGE AREAS:

- A. The location of the Contractor's storage areas for equipment and/or materials shall be upon cleared portions of the job site or areas to be cleared as a part of this project, and shall require written approval of the Engineer. Plans showing storage facilities for equipment and materials shall be submitted for approval of the Engineer.
- B. No excavated materials or materials used in backfill operations shall be deposited within a minimum distance of one hundred (100) feet of any watercourse or any drainage facility. Adequate measures for erosion and sediment control such as the placement of baled straw or line of straw wattles or compost filter tubes around the downstream perimeter of stockpiles shall be employed to protect any downstream areas from siltation.
- C. There shall be no storage of equipment or materials in areas designated as wetlands.
- D. The Engineer may designate a particular area or areas where the Contractor may store materials used in his operations.

3.06 PROTECTION OF LANDSCAPE:

A. The Contractor shall not deface, injure, or destroy trees or shrubs nor remove or cut them without written authority from the Owner. No ropes, cables, or guys shall be fastened to

or attached to any existing nearby trees for anchorages unless specifically authorized by the Engineer. Excavating machinery and cranes shall be of suitable type and be operated with care to prevent injury to trees which are not to be removed, particularly overhanging branches and limbs. The Contractor shall, in any event, be responsible for any damage resulting from such use.

- B. Branches, limbs, and roots shall not be cut except by permission of the Engineer. All cutting shall be smoothly and neatly done without splitting or crushing. When there is unavoidable injury to branches, limbs and trunks of trees, the injured portions shall be neatly trimmed and covered with an application of grafting wax or tree healing paint as directed.
- C. Where, in the opinion of the Engineer, trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or by his blasting or other operations, the Engineer may require the Contractor to adequately protect such trees by placing boards, planks, poles or fencing around them. Any trees or landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the expense of the Contractor. The Engineer will decide what method of restoration shall be used, and whether damaged trees shall be treated and healed or removed and disposed of under the provisions of Section 02230, CLEARING AND GRUBBING.
- D. Cultivated hedges, shrubs, and plants which could be injured by the Contractor's operations shall be protected by suitable means or shall be dug up, balled and temporarily replanted and maintained. After construction operations have been substantially completed, they shall be replanted in their original positions and cared for until growth is re-established. If cultivated hedges, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced by items of a kind and quality at least equal to that existing at the start of the work.

3.07 CLEARING AND GRUBBING:

- A. The Contractor shall clear and grub only on the Owner's land or the Owner's easements, and only the area required for construction operations, as approved by the Engineer. Removal of mature trees (4 inches or greater DBH) will not be allowed on temporary easements.
- B. The Contractor shall not remove trees in the Owner's temporary easements without permission of the Engineer.

3.08 DISCHARGE OF DEWATERING OPERATIONS:

A. Under no circumstances shall the Contractor discharge water to the areas designated as wetlands. When constructing in a wetlands area, the Contractor shall discharge water from dewatering operations directly to the nearest drainage system, stream, or waterway after filtering by an approved method.

B. The pumped water shall be filtered through filter fabric and baled straw, a vegetative filter strip or a vegetated channel to trap sediment occurring as a result of the construction operations. The vegetated channel shall be constructed such that the discharge flow rate shall not exceed a velocity of more than 1 foot per second. Accumulated sediment shall be cleared from the channel periodically.

3.09 DUST CONTROL:

- A. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of streets as necessary, to minimize creation and dispersion of dust. If the Engineer decides it is necessary to use calcium chloride for more effective dust control, the Contractor shall furnish and spread the material, as directed. Calcium chloride shall be as specified under Section 01562, DUST CONTROL.
- B. Calcium Chloride shall not be used for dust control within a drainage basin or in the vicinity of any source of potable water.

3.10 BALED STRAW:

A. To trap sediment and to prevent sediment from clogging drainage systems, baled straw shall be used where shown on the drawings. Care shall be taken to keep the bales from breaking apart. The bales should be securely staked to prevent overturning, flotation, or displacement. All deposited sediment shall be removed periodically. Straw bales shall not be placed within a waterway during construction of the pipeline crossing.

3.11 ERECTION AND MAINTENANCE OF SILT FENCE:

A. Where indicated on the drawings or where required by the Engineer, the Contractor shall erect and maintain a temporary silt fence. In areas designated as wetlands, the Contractor shall line the limits of the construction easement with a silt fence. The silt fence shall be used specifically to contain sediment from runoff water and to minimize environmental damage caused by construction.

3.12 CATCH BASIN PROTECTION:

A. Catch basin protection shall be used for every catch basin, shown on the plans or as required by the Engineer, to trap sediment and prevent it from clogging drainage systems and entering wetlands. Siltation sacks shall be securely installed under the catch basin grate. Care shall be taken to keep the siltation sacks from breaking apart or clogging. All deposited sediment shall be removed periodically and at times prior to predicted precipitation to allow free drainage flow. Prior to working in areas where catch basins are to be protected, each catch basin sump shall be cleaned of all debris and protected. The Contractor shall properly dispose of all debris at no additional cost to the Owner.

3.13 COMPOST FILTER TUBES:

A. The filter tubes will be staked in the ground using wooden stakes driven at 4-foot intervals. The wooden stakes will be placed at a minimum depth of 24-inches into the ground.

END OF SECTION

SECTION 01740

CLEANING UP

PART 1 - GENERAL

1.01 DESCRIPTION:

The Contractor must employ at all times during the progress of its work adequate cleanup measures and safety precautions to prevent injuries to persons or damage to property. The Contractor shall immediately, upon request by the Engineer provide adequate material, equipment and labor to cleanup and make safe any and all areas deemed necessary by the Engineer.

PART 2 - PRODUCTS

Not applicable

PART 3 - EXECUTION

3.01 DAILY CLEANUP:

- A. The Contractor shall clean up, at least daily, all refuse, rubbish, scrap and surplus material, debris and unneeded construction equipment resulting from the construction operations and sweep the area. The site of the work and the adjacent areas affected thereby shall at all times present a neat, orderly and workmanlike appearance.
- B. Upon written notification by the Engineer, the Contractor shall within 24 hours clean up those areas, which in the Engineer's opinion are in violation of this section and the above referenced sections of the specifications.
- C. If in the opinion of the Engineer, the referenced areas are not satisfactorily cleaned up, all other work on the project shall stop until the cleanup is satisfactory.

3.02 MATERIAL OR DEBRIS IN DRAINAGE FACILITIES:

A. Where material or debris has washed or flowed into or has been placed in existing watercourses, ditches, gutters, drains, pipes, structures, such material or debris shall be entirely removed and satisfactorily disposed of during progress of the work, and the ditches, channels, drains, pipes, structures, and work shall, upon completion of the work, be left in a clean and neat condition.

3.03 REMOVAL OF TEMPORARY BUILDINGS, STRUCTURES AND EQUIPMENT:

A. On or before completion of the work, the Contractor shall, unless otherwise specifically required or permitted in writing, tear down and remove all temporary buildings and structures it built; shall remove all temporary works, tools and machinery or other construction

01/24/2018 01740-1

equipment it furnished; shall remove all rubbish from any grounds which it has occupied; shall remove silt fences and hay bales used for trapping sediment; and shall leave the roads and all parts of the property and adjacent property affected by its operations in a neat and satisfactory condition.

3.04 RESTORATION OF DAMAGED PROPERTY:

A. The Contractor shall restore or replace, when and as required, any property damaged by its work, equipment or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk and landscaping work. Materials, equipment, and methods for such restoration shall be as approved by the Engineer.

3.05 FINAL CLEANUP:

A. Before acceptance by the Owner, the Contractor shall perform a final cleanup to bring the construction site to its original or specified condition. This cleanup shall include removing all trash and debris off of the premises. Before acceptance, the Engineer shall approve the condition of the site.

END OF SECTION

\\Wse03.local\\WSE\\Projects\\MA\\Arlington, MA\\DPW Facility\\Permitting\\Conservation\\NOI\\Appendix E Specs\\SECTION 01740-Cleaning Up.docx

Appendix F



TOWN OF ARLINGTON

730 Massachusetts Ave. Arlington, MA 02476 781-316-3012

ARLINGTON CONSERVATION COMMISSION

Abutter Notification

Notification to Abutters Under the Massachusetts Wetlands Protection Act And Arlington Wetlands Protection Bylaw

In accordance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, and the Arlington Wetlands Protection Bylaw, you are hereby notified of the following:

The Conservation Commission will hold a virtual public meeting using Zoom, on <u>Thursday the 5th</u>, <u>November, 2020</u>, at <u>7:30pm</u> in accordance with the provisions of the Mass. Wetlands Protection Act (M.G.L. Ch. 131, s. 40, as amended), the Town of Arlington Bylaws Article 8, Bylaw for Wetland Protection, and in accordance with the Governor's Order Suspending Certain Provisions of the Open Meeting Law, G. L. c. 30A, § 20 relating to the COVID-19 emergency, for a Notice of Intent from <u>Weston & Sampson Engineers on behalf of the Town of Arlington</u>, for <u>a DPW Facility project</u> at <u>51 Grove Street</u>, within <u>100 feet of a wetland resource</u>, <u>200 feet of a Riverfront and within a floodplain</u>, on Assessor's Property Map/s #54-3, Lot/s #2.A. Please refer to the Commission's online meeting agenda for specific Zoom meeting access information.

A copy of the application and accompanying plans are available by request by contacting the Arlington Conservation Agent at 781-316-3012 or esullivan@town.arlington.ma.us. For more information call the applicant at 978-532-1900 or the Arlington Conservation Commission at 781-316-3012, or the DEP Northeast Regional Office at 978-694-3200.

NOTE: Notice of the Public Hearing will be published at least five (5) business days in advance in *The Arlington Advocate* and will also be posted at least 48 hours in advance on the Arlington Town Hall website.

The meeting information for your hearing is:

Date: Thursday, November 5th 2020

Time: 7:30pm

Affidavit of Service

(Please return to Conservation Commission)

I, Alexandra Gaspar, being duly sworn, do hereby state as follows: on October 22nd, 2020, I mailed a "Notification to Abutters" in compliance with the second paragraph of Massachusetts General Laws, Chapter 131, s.40, the DEP Guide to Abutter Notification dated April 8, I994, and the Arlington Wetlands Protection Bylaw, Title V, Article 8 of the Town of Arlington Bylaws in connection with the following matter:

Improvements to the Arlington Department of Public Works facility.

The form of the notification, and a list of the abutters to whom it was provided and their addresses, are attached to this Affidavit of Service.

Signed under the pains and penalties of perjury, this 22nd day of October.

Alexandra Gaspar Name



Office of the Board of Assessors Robbins Memorial Town Hall Arlington, MA 02476 (781) 316-3050 Assessors@town,arlington,ma.us

Abutters List

Date: September 03, 2020

Subject Property Address: 49 GROVE ST Arlington, MA

Subject Property ID: 54-3-2.A

Subject Property Address: 0-LOT GROVE ST Arlington, MA

Subject Property ID: 54-3-2.B

Search Distance: 100 Feet

The Board of Assessors certifies the names and addresses of requested parties in interest, all abutters within 100 feet of the property lines, of subject properties.

Board of Assessors

Abutters List

Date: September 03, 2020

Subject Property Address: 49 GROVE ST Arlington, MA

Subject Property ID: 54-3-2.A

Subject Property Address: 0-LOT GROVE ST Arlington, MA

Subject Property ID: 54-3-2.B

Search Distance: 100 Feet

Prop ID: 53-2-4

Prop Location: 855 MASS AVE Arlington, MA Owner: TOWN OF ARLINGTON SCHOOL

Co-Owner: HIGH SCHOOL

Mailing Address: 730 MASS AVE

ARLINGTON, MA 02476

Prop ID: 53-2-7.B

Prop Location: 0-LOT MASS AVE Arlington, MA Owner: TOWN OF ARLINGTON SCHOOL

Co-Owner: HIGH SCHOOL

Mailing Address: 730 MASS AVE

ARLINGTON, MA 02476

Prop ID: 54-1-1

Prop Location: 0-LOT GROVE ST Arlington, MA

Owner: TOWN OF ARLINGTON PARK Co-Owner: ETHEL WELLINGTON PARK

Mailing Address: 730 MASS AVE

ARLINGTON, MA 02476

Prop ID: 54-1-21.A

Prop Location: 24-26 GROVE ST Arlington, MA Owner: LOMBARD LEON E JR/TRUSTEE Co-Owner: TARA-LEAH REALTY TR

Mailing Address: 20 GROVE ST

ARLINGTON, MA 02474

.

Prop ID: 54-1-24.A

Prop Location: 44 GROVE ST Arlington, MA

Owner: PRETZER XAVID

Co-Owner: Mailing Address: 44 GROVE ST

ARLINGTON, MA 02476

Prop ID: 54-1-25.A

Prop Location: 0-LOT DUDLEY ST Arlington, MA

Owner: PRETZER XAVID

Co-Owner: Mailing Address: 44 GROVE ST

ARLINGTON, MA 02476

Prop ID: 54-2-1.A

Prop Location: 50 GROVE ST Arlington, MA Owner: NOSTALGIA PROPERTIES LLC

Co-Owner: Mailing Address: 39 BRIGHTON AVE BOSTON, MA 02134

Prop ID: 54-2-1.B

Prop Location: 54 GROVE ST Arlington, MA Owner: NOSTALGIA PROPERTIES LLC

Co-Owner: Mailing Address: 39 BRIGHTON AVE BOSTON, MA 02134

Prop ID: 54-3-10

Prop Location: 0-LOT MASS AVE Arlington, MA Owner: FRAGER ALBERT S ETAL/ TRUSTEES

Co-Owner: MARBURY REALTY TRUST

Mailing Address: PO BOX 6500

AHOLD FINANCIAL SVC CARLISLE, PA 17013

Prop ID: 54-3-12

Prop Location: 0-LOT MASS AVE Arlington, MA Owner: TARLIN LLOYD ETAL TRUSTEES Co-Owner: MARBURY REALTY TRUST

Mailing Address: PO BOX 6500

AHOLD FINANCIAL SVC CARLISLE, PA 17013

Prop ID: 54-3-15

Prop Location: 905 MASS AVE Arlington, MA Owner: THE STOP&SHOP SUPERMRKT LESSEE

Co-Owner: TARLIN LLOYD D ETAL TRS

Mailing Address: P.O. BOX 6500

AHOLD FINANCIAL SVC CARLISLE, PA 17013

Prop ID: 54-3-19

Prop Location: 31 SCHOULER CT Arlington, MA Owner: TOWN OF ARLINGTON SCHOOL

Co-Owner: HIGH SCHOOL

Mailing Address: 730 MASS AVE

ARLINGTON, MA 02476

Prop ID: 54-3-2.C

Prop Location: 0-LOT GROVE ST Arlington, MA

Owner: BOSTON GAS COMPANY Co-Owner: DBA NATIONAL GRID

Mailing Address: 40 SYLVAN RD

SVI VAN PD 629 of 842

WALTHAM, MA 02451-1120

Prop ID: 54-3-2.D

Prop Location: 0-LOT GROVE ST Arlington, MA

Owner: BOSTON GAS COMPANY Co-Owner: DBA NATIONAL GRID

Mailing Address: 40 SYLVAN ST

WALTHAM, MA 02451-1120

Prop ID: 54-3-3.A

Prop Location: 25 GROVE ST Arlington, MA Owner: SUPPANISANUWONG PICHAI

Co-Owner: Mailing Address: 25 GROVE ST

ARLINGTON, MA 02476

Prop ID: 54-3-4.A

Prop Location: 17-21 GROVE ST Arlington, MA Owner: ARLINGTON-GROVE REALTY LLC

Co-Owner: Mailing Address: 59 UNION SQ

SOMERVILLE, MA 02143

Prop ID: 54-3-5.A

Prop Location: 13-15 GROVE ST Arlington, MA Owner: MORSE TODD S & HARIVOLOLONA

Co-Owner: Mailing Address: 15 GROVE ST

ARLINGTON, MA 02476

Prop ID: 54-3-6.A

Prop Location: 9 GROVE ST Arlington, MA Owner: PAULINO STEPHEN--ETAL

Co-Owner: ALLEN LORRAINE

Mailing Address: 9 GROVE ST REAR ARLINGTON, MA 02476

Prop ID: 54-3-6.B

Prop Location: 11 GROVE ST Arlington, MA

Owner: BROWN PAULA G

Co-Owner: Mailing Address: 11 GROVE ST

ARLINGTON, MA 02476

Prop ID: 68-3-12

Prop Location: 67-71 GROVE ST Arlington, MA

Owner: JOHNSON SANDRA A--ETAL Co-Owner: JOHNSON RICHARD A

Mailing Address:

1026 MASS AVE SUITE 1 ARLINGTON, MA 02476

Prop ID: 68-3-4

Prop Location: 158 SUMMER ST Arlington, MA

Owner: SOUSA LEE JEANNE

Co-Owner: Mailing Address: 158 SUMMER ST ARLINGTON, MA 02474

Prop ID: 68-3-7

Prop Location: 166-168 SUMMER ST Arlington, MA

Owner: ROUCHI KEYHAN

Co-Owner: Mailing Address: 168 SUMMER ST ARLINGTON, MA 02474

Prop ID: 68-3-8

Prop Location: 170-178 SUMMER ST Arlington, MA

Owner: CAMPOBASSO PROPERTIES LLC

Co-Owner: Mailing Address: 290 MASS AVE

ARLINGTON, MA 02474

Prop ID: 68.A-3-1

Prop Location: 162 SUMMER ST UNIT 1 Arlington, MA

Owner: FITZGERALD ANN V

Co-Owner: Mailing Address:

162 SUMMER STREET UNIT 1 ARLINGTON, MA 02474

Prop ID: 68.A-3-164

Prop Location: 164 SUMMER ST Arlington, MA

Owner: BOHMONT CLARK Co-Owner: UZIEL LIDIA Mailing Address: 164 SUMMER ST

ARLINGTON, MA 02474

Prop ID: 68.A-3-164.R

Prop Location: 164-R SUMMER ST Arlington, MA Owner: HAAS CHRISTOPHER F & ANDREA L

Co-Owner: Mailing Address: 164R SUMMER ST ARLINGTON, MA 02474

Prop ID: 68.A-3-2

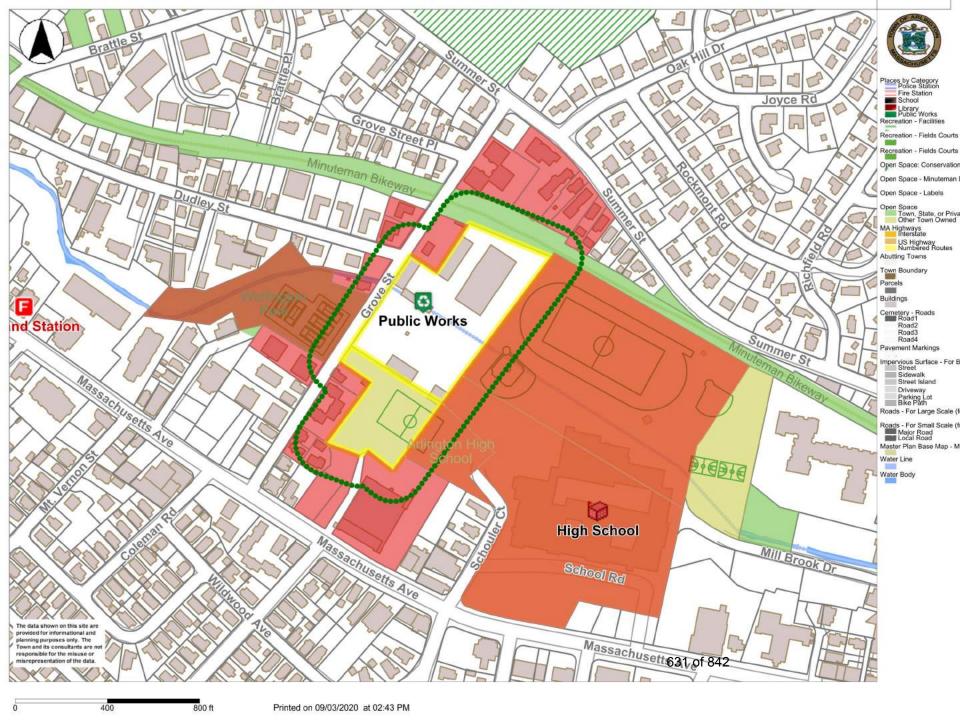
Prop Location: 162 SUMMER ST UNIT 2 Arlington, MA

Owner: RAMOS JUAN M & Co-Owner: SESTOKAS JANET

Mailing Address:

162 SÜMMER STREET UNIT 2 ARLINGTON, MA 02474

630 of 842



Appendix G



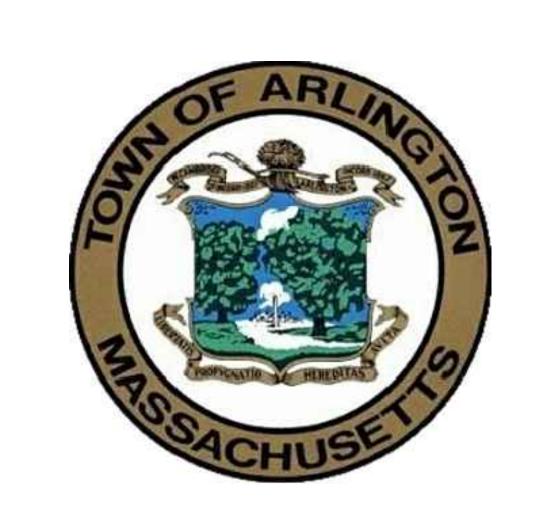


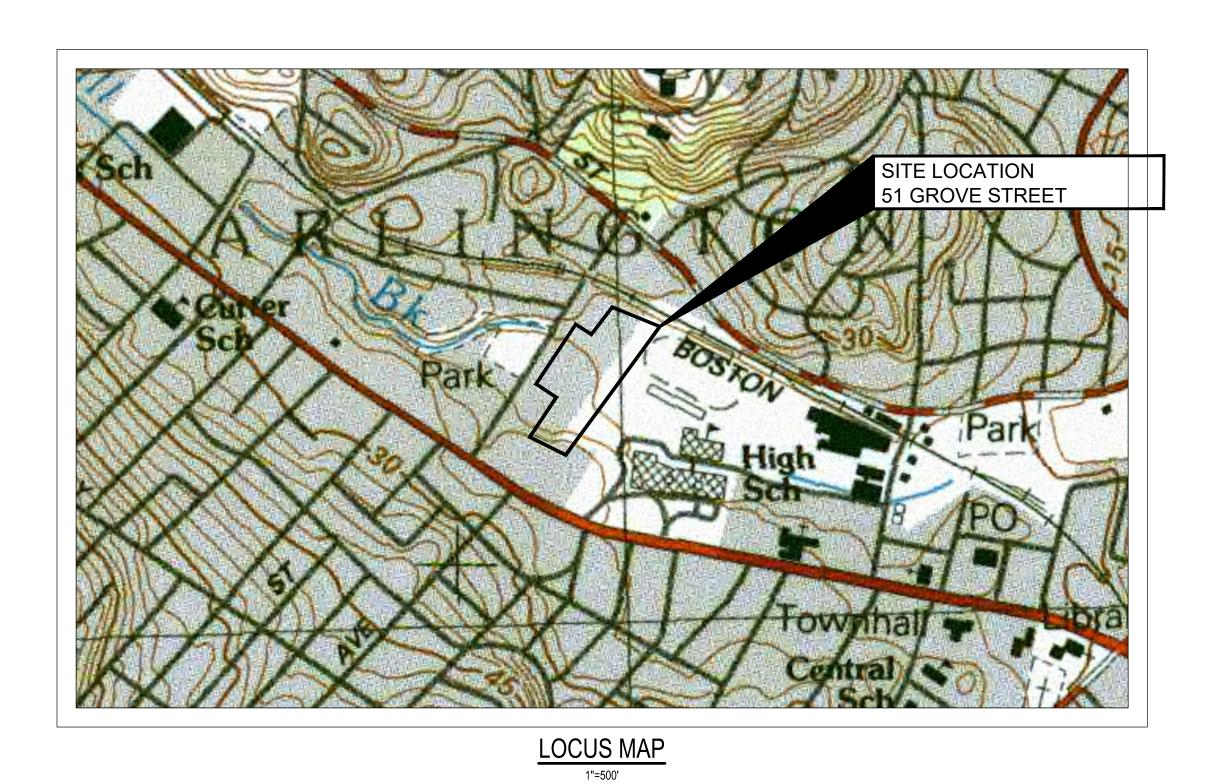


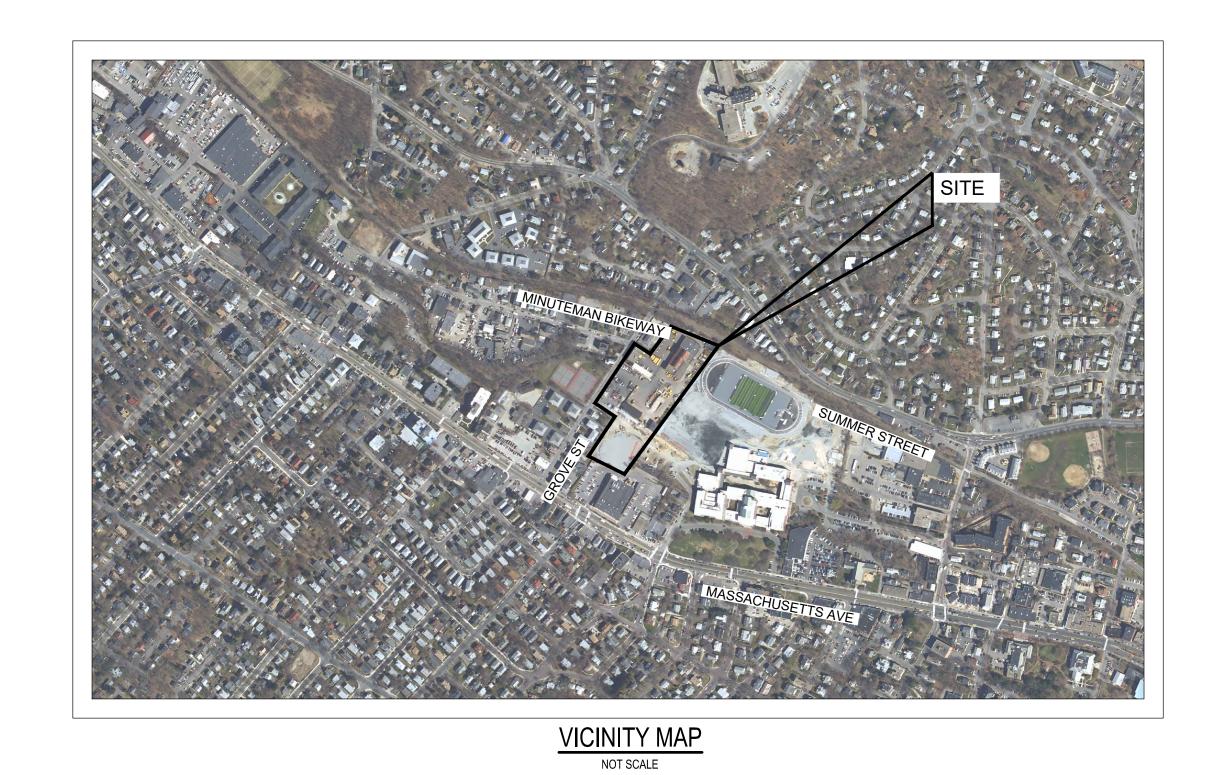


TOWN OF ARLINGTON

ARLINGTON TOWN YARD FACILITY 51 GROVE STREET, ARLINGTON, MA







DRAWING INDEX

TITLE GENERAL NOTES & LEGEND **EXISTING CONDITIONS PLAN** SOIL EROSION AND SEDIMENT CONTROL PLAN DEMOLITION PLAN (PHASE 1) DEMOLITION PLAN (PHASE 2) LAYOUT AND MATERIALS PLAN UTILITY PLAN GRADING AND DRAINAGE PLAN - OVERALL GRADING AND DRAINAGE PLAN - WEST GRADING AND DRAINAGE PLAN - EAST **DETAILS** DETAILS **DETAILS** DETAILS DETAILS DETAILS DETAILS PLANTING PLAN L100



Weston & Sampson Engineers, Inc.
100 Foxborough Boulevard, Suite 250
Foxborough, MA 02035
978.532.1900 800.SAMPSON

, ,

www.westonandsampson.com

Issued Date:

10/21/2020



PERMITTING

GENERAL NOTES

- 1. TOPOGRAPHICAL INFORMATION BASED UPON SURVEY PERFORMED BY WESTON & SAMPSON.
- 2. REFER TO EXISTING CONDITIONS FOR SURVEY LEGEND. ALL BIDDERS ARE REQUIRED TO INSPECT THE PROJECT SITE IN ITS ENTIRETY PRIOR TO SUBMITTING THEIR BID, AND BECOME FAMILIAR WITH ALL CONDITIONS AS THEY MAY AFFECT THEIR BID. CONTRACTOR AND SUB—CONTRACTOR SHALL BE FAMILIAR WITH ALL DRAWINGS AND SPECIFICATIONS PRIOR TO COMMENCING THE CONSTRUCTION.
- 3. LOCATIONS OF ANY UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION OF SUCH UTILITIES, PROTECTING ALL EXISTING UTILITIES AND REPAIRING ANY DAMAGE DONE DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON—SITE COORDINATION WITH UTILITY COMPANIES AND PUBLIC AGENCIES AND FOR OBTAINING ALL REQUIRED PERMITS AND PAYING ALL REQUIRED FEES. IN ACCORDANCE WITH M.G.L. CHAPTER 82, SECTION 40, INCLUDING AMENDMENTS, CONTRACTORS SHALL NOTIFY ALL UTILITY COMPANIES AND GOVERNMENT AGENCIES IN WRITING PRIOR TO EXCAVATION. CONTRACTOR SHALL ALSO CALL "DIG SAFE" AT (888) 344—7233 NO LESS THAN 72 HOURS, (EXCLUSIVE OF WEEKENDS AND HOLIDAYS), PRIOR TO SUCH EXCAVATION. DOCUMENTATION OF REQUESTS SHALL BE PROVIDED TO PROJECT REPRESENTATIVE PRIOR TO EXCAVATION WORK.
- 4. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
- 5. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY OWNER AT NO ADDITIONAL COST TO THE TOWN.
- 6. CONTRACTOR SHALL BE RESPONSIBLE FOR REVIEWING ALL DRAWINGS AND SPECIFICATIONS TO DETERMINE THE EXTENT OF EXCAVATION AND DEMOLITION REQUIRED TO RECEIVE SITE IMPROVEMENTS.
- 7. ANY DISCREPANCIES OR CONFLICTS BETWEEN THE DRAWINGS AND EXISTING CONDITIONS, EXISTING CONDITIONS TO REMAIN, TEMPORARY CONSTRUCTION, PERMANENT CONSTRUCTION AND WORK OF ADJACENT CONTRACTS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER BEFORE PROCEEDING. ITEMS ENCOUNTERED IN AREAS OF EXCAVATION THAT ARE NOT INDICATED ON THE DRAWINGS, BUT ARE VISIBLE ON SURFACE, SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND SHALL BE REMOVED AT NO ADDITIONAL COST TO THE TOWN.
- 8. ANY ALTERATIONS TO THESE DRAWINGS MADE IN THE FIELD DURING CONSTRUCTION SHALL BE RECORDED BY THE GENERAL CONTRACTOR ON "AS-BUILT" DRAWINGS.
- 9. ALL AREAS DISTURBED BY THE CONTRACTOR'S OPERATIONS OUTSIDE THE PROJECT LIMITS, SHALL BE RESTORED TO THE ORIGINAL CONDITION BY THE CONTRACTOR AT NO ADDITIONAL COST AND TO THE SATISFACTION OF THE OWNER.
- 10. ALL WORK SHOWN ON THE PLANS AS BOLD SHALL REPRESENT PROPOSED WORK. THE TERM "PROPOSED (PROP)" INDICATES WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET (R&R)", OR REMOVE, RELOCATE, RESET, (R,R&R).
- 11. ALL KNOWN EXISTING STATE, COUNTY AND TOWN LOCATION LINES AND PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND ARE INDICATED ON THE PLANS.
- 12. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT HIS EMPLOYEES, AS WELL AS PUBLIC USERS FROM INJURY DURING THE ENTIRE CONSTRUCTION PERIOD USING ALL NECESSARY SAFEGUARDS, INCLUDING BUT NOT LIMITED TO, THE ERECTION OF TEMPORARY WALKS, STRUCTURES, PROTECTIVE BARRIERS, COVERING, OR FENCES AS NEEDED.
- 13. THE CONTRACTOR SHALL SUPPLY THE OWNER WITH THE NAME OF THE OSHA "COMPETENT PERSON" PRIOR TO CONSTRUCTION.
- 14. FILLING OF EXCAVATED AREAS SHALL NOT TAKE PLACE WITHOUT THE PRESENCE OR PERMISSION OF THE
- 15. EXISTING TREES TO REMAIN SHALL BE PROTECTED FROM CONSTRUCTION ACTIVITIES. NO STOCKPILING OF MATERIAL, EQUIPMENT OR VEHICULAR TRAFFIC SHALL BE ALLOWED WITHIN THE DRIP LINE OF TREES TO REMAIN NO GUYS SHALL BE ATTACHED TO ANY TREE TO REMAIN. WHEN NECESSARY OR AS DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL ERECT TEMPORARY BARRIERS FOR THE PROTECTION OF EXISTING TREES
- 16. TREES AND SHRUBS WITHIN THE LIMITS OF WORK SHALL BE REMOVED ONLY UPON THE APPROVAL OF THE ENGINEER OR AS NOTED ON THE PLANS.
- 17. THE CONTRACTOR SHALL CALL DIGSAFE AT 1-888-344-7233 AT LEAST 72 HOURS, SATURDAYS, AND HOLIDAYS EXCLUDED, PRIOR TO EXCAVATING AT ANY LOCATION. A COPY OF THE DIGSAFE PROJECT REFERENCE NUMBER(S) SHALL BE GIVEN TO THE OWNER PRIOR TO EXCAVATION.
- 18. NO FILLING SHALL OCCUR AROUND EXISTING TREES TO REMAIN WITHOUT THE APPROVAL OF THE OWNER OR OWNER REPRESENTATIVE.
- 19. THE CONTRACTOR SHALL REMOVE ALL SURFACE VEGETATION PRIOR TO GRADING THE SITE. STUMPS SHALL BE STOCKPILED ON SITE FOR DISPOSAL BY THE TOWN. TEMPORARY EROSION CONTROL MEASURES SHOWN ON THE DRAWINGS (INCLUDING SILT FENCE, STRAW WATTLES, OR SILT SOCKS) SHALL BE INSTALLED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THESE TEMPORARY EROSION CONTROL MEASURES THROUGHOUT THE PROJECT WHICH COST SHALL BE INCIDENTAL TO THE PROJECT.
- 20. ALL UNSUITABLE UNCONTAMINATED EXCESS SOIL FROM CONSTRUCTION ACTIVITIES SHALL BE DISPOSED OF THE BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE TOWN. REMOVAL ACTIVITIES SHALL BE ACCORDANCE WITH STATE AND LOCAL REGULATIONS AT NO ADDITIONAL COST TO THE TOWN. SUITABLE SOIL EXCAVATION AS PART OF THE PROJECT MUST MEET ONE OR MORE OF THE MATERIAL REQUIREMENTS SPECIFIED IN 31 00 00 EARTHWORK. ON—SITE FILL MATERIALS, WHICH DO NOT CONFORM TO SPEC 31 00 00, SHALL NOT BE USED BELOW ANY STRUCTURES. IF THE CONTRACTOR PROPOSES TO USE THE EXISTING FILL ON SITE BELOW PAVEMENT AREAS, HE MUST DEMONSTRATE THAT THE FILL MEETS THE STRUCTURAL FILL REQUIREMENTS PER 31 00 00. ALL EXCAVATED FILL MATERIAL WHICH DOES NOT MEET THE REQUIREMENTS OF THE CONTRACT DOCUMENTS SHALL BE REMOVED AND DISPOSED OF OFF—SITE AT NO ADDITIONAL COST.
- 21. CONTRACTOR IS RESPONSIBLE FOR STAKING CONSTRUCTION BASELINES IN FIELD. NO CONSTRUCTION WILL BE PERFORMED WITHOUT THE PROPOSED BASELINES AND LAYOUTS APPROVED BY THE ENGINEER.
- 22. NO FILL SHALL CONTAIN HAZARDOUS MATERIALS.

DURING CONSTRUCTION.

- 23. CONTRACTOR SHALL PROVIDE TEMPORARY FENCING AROUND PERIMETER OF WORK AREA (LIMIT OF WORK). FENCE SHALL NOT IMPEDE TRAVEL WAYS.
- 24. ANY QUANTITIES SHOWN ON PLANS ARE FOR COMPARATIVE BIDDING PURPOSES ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VISIT THE PROJECT SITE TO VERIFY ALL QUANTITIES AND CONDITIONS PRIOR TO SUBMITTING
- 25. ALL EXISTING DRAINAGE FACILITIES TO REMAIN SHALL BE MAINTAINED FREE OF DEBRIS, SOIL, SEDIMENT, AND FOREIGN MATERIAL AND OPERATIONAL THROUGHOUT THE LIFE OF THE CONTRACT. REMOVE ALL SOIL, SEDIMENT, DEBRIS AND FOREIGN MATERIAL FROM ALL DRAINAGE STRUCTURES, INCLUDING BUT NOT LIMITED TO, DRAINAGE INLETS, MANHOLES AND CATCH BASINS WITHIN THE LIMIT OF WORK AND DRAINAGE STRUCTURES OUTSIDE THE LIMIT OF WORK THAT ARE IMPACTED BY THE WORK FOR THE ENTIRE DURATION OF CONSTRUCTION.
- 26. CONTRACTOR'S STAGING AREA MUST BE WITHIN THE CONTRACT LIMIT LINE AND IN AREAS APPROVED BY OWNER. ANY OTHER AREAS THAT THE CONTRACTOR MAY WISH TO USE FOR STAGING MUST BE COORDINATED WITH THE OWNER.
- 27. THE CONTRACTOR SHALL KEEP ALL STREETS, PARKING LOTS AND WALKS THAT ARE NOT RESTRICTED FROM PUBLIC USE DURING CONSTRUCTION BROOM CLEAN AT ALL TIMES. THE CONTRACTOR SHALL USE ACCEPTABLE METHODS AND MATERIALS TO MAINTAIN ADEQUATE DUST CONTROL THROUGHOUT CONSTRUCTION.
- 28. CONTRACTOR SHALL COORDINATE ALL WORK WITH THE OWNER.
- 29. CONTRACTOR SHALL DEWATER AS NECESSARY TO PERFORM THE PROPOSED WORK. CONTRACTOR SHALL BE AWARE OF PERCHED GROUNDWATER. (SEE SPECIFICATION SECTION 00320 SUBSURFACE DATA).
- 30. THE LIMIT OF WORK SHALL BE DELINEATED IN THE FIELD PRIOR TO THE START OF SITE CLEARING OR CONSTRUCTION.
- 31. DEEP SUMP CATCH BASINS SHALL BE CLEANED FOLLOWING CONSTRUCTION AND SHALL FOLLOW THE OPERATION AND MAINTENANCE PLAN THEREAFTER.
- 32. HAULING OF EARTH MATERIALS TO AND FROM THE SITE SHALL BE RESTRICTED TO THE HOURS OF 7:00 AM TO 5:00 PM MONDAY THROUGH FRIDAY.
- 33. ANY BOULDERS 3 CY OR SMALLER SHALL BE CONSIDERED UNDOCUMENTED FILL AND SHALL BE DISPOSED OF AT NO ADDITIONAL COST TO THE TOWN.
- 34. WORK ON SATURDAYS SHALL ONLY BE CONDUCTED IF PRIOR WRITTEN PERMISSION IS PROVIDED BY THE TOWN.
 35. THE TERM "AS DIRECTED" AS USED IN THE CONTRACT DRAWINGS SHALL BE REPLACED WITH "AS REQUIRED".
- EROSION AND SEDIMENT CONTROL NOTES

 1. ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE PUT INTO PLACE PRIOR TO BEGINNING ANY
- CONSTRUCTION OR DEMOLITION. REFER TO PLAN FOR APPROXIMATE LOCATION OF EROSION AND SEDIMENT CONTROL. REFER TO SPECS AND DETAILS FOR TYPE OF EROSION AND SEDIMENT CONTROL.
- THROUGHOUT THE DURATION OF THE PROJECT.
- 3. CONTRACTOR SHALL MEET ALL OF THE STATE OF MASSACHUSETTS D.E.P. AND THE TOWN OF ARLINGTON WETLAND ORDINANCE REGULATIONS FOR SEDIMENT AND EROSION CONTROL.
- 4. EXCAVATED MATERIAL STOCKPILED ON THE SITE SHALL BE SURROUNDED BY A RING OF UNBROKEN SEDIMENT AND EROSION CONTROL FENCE. THE LIMITS OF ALL GRADING AND DISTURBANCE SHALL BE KEPT TO A MINIMUM WITHIN THE APPROVED AREA OF CONSTRUCTION. ALL AREAS OUTSIDE OF THE LIMIT OF CONTRACT SHALL REMAIN TOTALLY UNDISTURBED UNLESS OTHERWISE APPROVED BY OWNER'S REPRESENTATIVE.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTINUAL MAINTENANCE OF ALL CONTROL DEVICES

- 5. ALL CATCH BASINS AND DRAIN GRATES WITHIN LIMIT OF CONTRACT SHALL BE PROTECTED WITH FILTER FABRIC DURING THE ENTIRE DURATION OF CONSTRUCTION.
- 6. EROSION CONTROL BARRIERS TO BE INSTALLED AT THE TOE OF SLOPES. SEE GRADING & DRAINAGE PLANS, NOTES, DETAILS AND SPECIFICATIONS.
- 7. ANY AREA OUTSIDE THE PROJECT LIMIT THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO COST TO THE OWNER.
- 8. THE CONTRACTOR SHALL PROVIDE DUST CONTROL FOR CONSTRUCTION OPERATIONS AS APPROVED BY OWNER.
- 9. ALL POINTS OF CONSTRUCTION EGRESS OR INGRESS SHALL BE MAINTAINED TO PREVENT TRACKING OR FLOWING OF SEDIMENT ON TO PUBLIC/PRIVATE ROADS. 636 of 842

DEMOLITION & SITE PREPARATION NOTES

- 1. THE CONTRACTOR SHALL INCLUDE IN THE BID THE COST OF REMOVING ANY EXISTING SITE FEATURES AND APPURTENANCES NECESSARY TO ACCOMPLISH THE CONSTRUCTION OF THE PROPOSED SITE IMPROVEMENTS. THE CONTRACTOR SHALL ALSO INCLUDE IN THE BID THE COST NECESSARY TO RESTORE SUCH ITEMS IF THEY ARE SCHEDULED TO REMAIN AS PART OF THE FINAL SITE IMPROVEMENTS. REFER TO PLANS TO DETERMINE EXCAVATION, DEMOLITION AND TO DETERMINE THE LOCATION OF THE PROPOSED SITE IMPROVEMENTS.
- 2. THE OWNER RESERVES THE RIGHT TO REVIEW ALL MATERIALS DESIGNATED FOR REMOVAL AND TO RETAIN OWNERSHIP OF SUCH MATERIALS. IF THE OWNER RETAINS ANY MATERIAL THE CONTRACTOR SHALL MAKE ARRANGEMENTS WITH THE OWNER TO HAVE THOSE MATERIALS REMOVED OFF SITE AT NO ADDITIONAL COST.
- 3. UNLESS SPECIFICALLY NOTED TO BE SAVED / STOCKPILED (R&S) OR REUSED / RELOCATED (R&R), ALL SITE FEATURES CALLED FOR REMOVAL (REM) SHALL BE REMOVED WITH THEIR FOOTINGS, ATTACHMENTS, BASE MATERIAL, ETC, TRANSPORTED FROM THE SITE TO BE DISPOSED OF IN A LAWFUL MANNER AT AN ACCEPTABLE DISPOSAL SITE AND AT NO COST TO THE OWNER.
- 4. ALL EXISTING SITE FEATURES TO REMAIN SHALL BE PROTECTED THROUGHOUT THE CONSTRUCTION PERIOD. ANY FEATURES DAMAGED DURING CONSTRUCTION OPERATIONS SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE AT NO ADDITIONAL COST.
- 5. DURING EARTHWORK OPERATIONS, CONTRACTOR SHALL TAKE CARE TO NOT DISTURB EXISTING MATERIALS TO REMAIN, OUTSIDE THE LIMITS OF EXCAVATION AND BACKFILL AND SHALL TAKE WHATEVER MEASURES NECESSARY, AT THE CONTRACTOR'S EXPENSE, TO PREVENT ANY EXCAVATED MATERIAL FROM COLLAPSING. ALL BACKFILL MATERIALS SHALL BE PLACED AND COMPACTED AS SPECIFIED TO THE SUBGRADE REQUIRED FOR THE INSTALLATION OF THE REMAINDER OF THE CONTRACT WORK.
- 6. IT SHALL BE THE CONTRACTOR'S OPTION, WITH CONCURRENCE OF THE OWNER, TO REUSE EXISTING GRAVEL IF IT MEETS THE REQUIREMENTS OF THE SPECIFICATIONS FOR GRAVEL BORROW.
- 7. ALL ITEMS CALLED FOR REMOVAL SHALL BE REMOVED TO FULL DEPTH INCLUDING ALL FOOTINGS, FOUNDATIONS, AND OTHER APPURTENANCES, EXCEPT AS SPECIFICALLY NOTED OTHERWISE.
- 8. 'CLEAR AND GRUB VEGETATION' SHALL INCLUDE REMOVAL OF GRASS, SHRUBS, AND UNDERBRUSH, REMOVAL OF ROOTS, ROUGH GRADING, INSTALLATION OF LOAM (IF APPLICABLE), FINE GRADING, SEEDING AND TURF ESTABLISHMENT BY THE CONTRACTOR.
- 9. TREES DESIGNATED FOR REMOVAL SHALL BE TAGGED BY CONTRACTOR AND APPROVED BY OWNER'S REPRESENTATIVE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
- 10. THE STORAGE OF MATERIALS AND EQUIPMENT WILL BE PERMITTED AT LOCATIONS DESIGNATED BY OWNER OR OWNER'S REPRESENTATIVE. PROTECTION OF STORED MATERIALS AND EQUIPMENT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- 11. STRIP & STORE EXISTING TOPSOIL FOR LATER REUSE WHERE APPROPRIATE, AND AS NOTED ON PLAN, WITH APPROPRIATE EROSION AND SEDIMENT CONTROLS.
- 12. THE CONTRACTOR SHALL PROTECT EXISTING TREES TO REMAIN, CONTRACTOR SHALL INSTALL TREE PROTECTION BARRIER AFTER CLEARING UNDERBRUSH AND TAKE DUE CARE TO PREVENT INJURY TO TREES DURING CLEARING OPERATIONS.

LAYOUT & MATERIALS NOTES

- 1. REFER TO EXISTING CONDITIONS PLANS FOR SURVEY INFORMATION (SHEET C1.01).
- 2. COORDINATE ALL LAYOUT ACTIVITIES WITH THE SCOPE OF WORK CALLED FOR BY DEMOLITION, GRADING AND UTILITIES OPERATIONS ENCOMPASSED BY THIS CONTRACT. SET, PROTECT AND REPLACE REFERENCE STAKES AS NECESSARY OR AS REQUIRED BY THE OWNER'S REPRESENTATIVE.
- 3. ALL WORK SHALL BE PERFORMED BY CONTRACTOR UNLESS SPECIFICALLY INDICATED THAT THE WORK WILL BE PERFORMED "BY TOWN".
- 4. TO FACILITATE LAYOUT OF PROPOSED SITE FEATURES AND FACILITIES, LAYOUT INFORMATION FOR CERTAIN FUTURE WORK, WHICH IS NOT INCLUDED WITHIN THE SCOPE OF THIS CONTRACT HAS BEEN PROVIDED ON THE LAYOUT AND MATERIALS PLAN FOR INFORMATION ONLY. THE LAYOUT OF SITE AMENITIES AND FENCES MUST BE APPROVED BY THE OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION. SOME ITEMS ARE "NOT IN CONTRACT" (NIC) AND SHOWN FOR REFERENCE ONLY.
- 5. THE LAYOUT OF SITE AMENITIES AND FENCES MUST BE APPROVED BY THE OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
- 6. THE LAYOUT OF ALL NEW PATHWAYS / WALKWAYS AND THE GRADING OF ALL SLOPES AND CROSS SLOPES SHALL CONFORM TO THE COMMONWEALTH OF MASSACHUSETTS RULES AND REGULATIONS FOR HANDICAP ACCESS CMR 521, AND THE AMERICANS WITH DISABILITIES ACT (ADA), TITLE 3. THE CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY OF ANY DISCREPANCIES BETWEEN ACTUAL CONDITIONS AND THOSE REQUIRED.
- 7. ALL LAYOUT LINES, OFFSETS, OR REFERENCES TO LOCATING OBJECTS ARE EITHER PARALLEL OR PERPENDICULAR UNLESS OTHERWISE DESIGNATED WITH ANGLE OFFSETS NOTED.
- 8. ALL PROPOSED SITE FEATURES SHALL BE LAID OUT AND STAKED FOR REVIEW AND APPROVAL BY THE OWNER'S REPRESENTATIVE PRIOR TO COMMENCEMENT OF INSTALLATION. ANY REQUIRED ADJUSTMENTS TO THE LAYOUT SHALL BE UNDERTAKEN AS DIRECTED, AT NO ADDITIONAL COST TO THE OWNER.
- 9. ALL PROPOSED PAVEMENTS SHALL MEET THE LINE AND GRADE OF EXISTING ADJACENT PAVEMENT SURFACES AND SHALL BE TREATED WITH AN RS-1 TACK COAT AT POINT OF CONNECTION. ALL PATHWAY WIDTHS SHALL BE AS NOTED ON THE LAYOUT AND MATERIALS PLAN.
- 10. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND GRADES ON THE GROUND AND REPORT ANY DISCREPANCIES IMMEDIATELY TO THE OWNER.
- 11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD MEASUREMENT OF ALL PROPOSED FENCES AND GATES.
- 12. THE DEPTH OF LOAM BORROW FOR ALL PROPOSED LAWN AREAS SHALL BE 4" MINIMUM. ALL DISTURBED AREAS SHALL BE RESTORED WITH LOAM AND SEED UNLESS OTHERWISE NOTED
- 13. ALL REFERENCES TO LOAM AND SEED (L&S) REFER TO HYDROMULCH SEEDED LAWN.
- 14. REFER TO DETAIL DRAWINGS FOR CONSTRUCTION DETAILS.

GRADING, UTILITIES & DRAINAGE NOTES

- I. ALL WORK RELATING TO INSTALLATION, RENOVATION OR MODIFICATION OF WATER, DRAINAGE AND/OR SEWER SERVICES SHALL BE PERFORMED IN ACCORDANCE WITH THE STANDARDS OF THE TOWN OF ARLINGTON.
- 2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND GRADES ON THE GROUND AND REPORT ANY DISCREPANCIES IMMEDIATELY TO THE OWNER.
- 3. ALL GRADING IS TO BE SMOOTH AND CONTINUOUS WHERE PROPOSED GRAVEL SURFACE MEETS EXISTING SURFACE, BLEND THE TWO PAVEMENTS AND ELIMINATE ROUGH SPOTS AND ABRUPT GRADE CHANGES AND MEET LINE AND GRADE OF EXISTING CONDITIONS WITH NEW IMPROVEMENTS.
- 4. CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE (1.5% MINIMUM) AWAY FROM ALL BUILDING FOUNDATIONS AND STRUCTURES.
- 5. CONTRACTOR SHALL ENSURE ALL AREAS ARE PROPERLY PITCHED TO DRAIN, WITH NO SURFACE WATER PONDING OR PUDDLING.
- 6. ALL NEW WALKWAYS / ACCESS PATHS MUST CONFORM TO CURRENT AMERICANS WITH DISABILITIES ACT (ADA) REGULATIONS: WALKWAYS SHALL MAINTAIN A CROSS PITCH OF NOT MORE THAN ONE AND A HALF PERCENT (1.5%) AND THE RUNNING SLOPE (PARALLEL TO THE DIRECTION OF TRAVEL) BETWEEN 1% MIN. AND 5% MAX.
- 7. MINIMUM SLOPE ON ALL WALKWAYS WILL BE 1:100 OR 1% TO PROVIDE POSITIVE DRAINAGE. ANY DISCREPANCIES NOT ALLOWING THIS TO OCCUR SHALL BE REPORTED TO THE ENGINEER PRIOR TO CONTINUING WORK.
- 8. ALL UTILITY GRATES, COVERS OR OTHER SURFACE ELEMENTS INTENDED TO BE EXPOSED AT GRADE SHALL BE FLUSH WITH THE ADJACENT FINISHED GRADE AND ADJUSTED TO PROVIDE A SMOOTH TRANSITION AT ALL EDGES.
- 9. THE CONTRACTOR SHALL SET SUBGRADE ELEVATIONS TO ALLOW FOR POSITIVE DRAINAGE AND PROVIDE EROSION CONTROL DEVICES, STRUCTURES, MATERIALS AND CONSTRUCTION METHODS TO DIRECT SILT MIGRATION AWAY FROM DRAINAGE AND OTHER UTILITY SYSTEMS, PUBLIC/PRIVATE STREETS AND WORK AREAS. CLEAN BASINS REGULARLY AND AT THE END OF THE PROJECT.
- 10. EXCAVATION REQUIRED WITHIN PROXIMITY OF KNOWN EXISTING UTILITY LINES SHALL BE DONE BY HAND. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING UTILITY LINES OR STRUCTURES INCURRED DURING CONSTRUCTION OPERATIONS AT NO COST TO THE OWNER.
- 11. WHERE NEW EARTHWORK MEETS EXISTING EARTHWORK, CONTRACTOR SHALL BLEND NEW EARTHWORK SMOOTHLY INTO EXISTING, PROVIDING VERTICAL CURVES OR ROUNDS AT ALL TOP AND BOTTOM OF SLOPES.
- WITHIN 5 FEET OF PROPOSED CONTOURS.

 13. RESTORE ALL DISTURBED AREAS AND LIMITS OF ALL REMOVALS TO LOAM AND SEED (L&S) UNLESS OTHERWISE

12. WHERE A SPECIFIC LIMIT OF WORK LINE IS NOT OBVIOUS OR IMPLIED, BLEND GRADES TO EXISTING CONDITIONS

- NOTED.

 14. SEE EARTHWORK SECTION OF SPECIFICATIONS FOR SPECIFIC EXCAVATION AND FILLING PROCEDURES.
- 15. FOR STRUCTURE REMODELING (REMOD), CONSTRUCTION METHODS SHALL FOLLOW MASSACHUSETTS DOT STANDARD SPEC. LATEST EDITION (SECTION 220)

ABBREVIATIONS

<u>GENERAL</u>

ABANDON ADJUST BASELINE CONC **BITUMINOUS CONCRETE** B.M. BENCH MARK BROKEN WHITE LANE LINE CEM. CONC. CEMENT CONCRETE CHAIN LINK FENCE CONNECT TO EXISTING **ELECTRICAL CONTRACTOR** EDGE OF PAVEMENT EQUIPMENT ENTRANCE ELECTRIC VEHICLE CHARGING STATION (OR EX.) **EXISTING** GRAN. CURB GRANITE CURB FOUNDATION FDN FFE FINISHED FLOOR ELEVATON (OR F) FLOW LINE GENERAL CONTRACTOR HANDICAP HOT MIX ASPHALT LIMIT OF WORK MAIL BOX MASSACHUSETTS HIGHWAY BOUND NOT IN CONTRACT NOT TO SCALE PROPERTY LINE PLUMBING CONTRACTOR PROPOSED **PROTECT PAVEMENT** PAVED WATERWAY REINFORCED CONCRETE REMOVE REMODEL REMOD ROOF LEADER RETAIN REMOVE AND RESET

REMOVE. RELOCATED AND RESET

REMOVE AND DISPOSE

STONE BOUND/ DRILL HOLE

SOLID WHITE EDGE LINE

SOLID YELLOW EDGE LINE

REMOVE AND STACK

RIGHT-OF-WAY

STONE BOUND

TEMPORARY

VERIFY IN FIELD

WHEELCHAIR RAMP

TYPICAL

UTILITIES

R.R&R

R.O.W.

SYEL

CB CBCI CI CI C.I.T. CIP CMP CO DI DMH DS GICI F&C F&G GI GV GW HDPE HH HYD INV. ELEV. LB LC LG LP OCS OGT OHW PVC RCP SMH SWTU UP	LEACHING BASIN LEACHING CHAMBER LEACHING GALLEY LIGHT POLE OUTLET CONTROL STRUCTURE OIL AND GRIT TRAP OVERHEAD WIRE POLYVINYL CHLORIDE REINFORCED CONCRETE PIPE SEWER MANHOLE STORM WATER TREATMENT UNIT UTILITY POLE
SWTU	STORM WATER TREATMENT UNIT

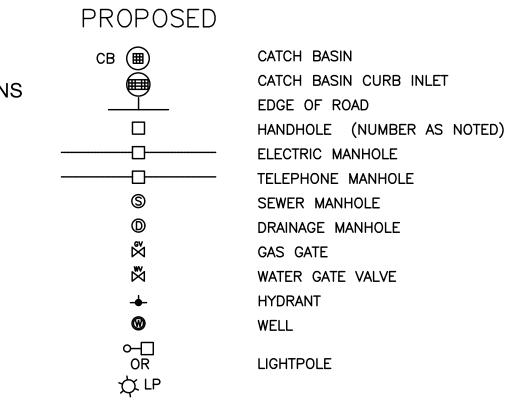
ALIGNMENT/GRADING

BC BW CC ELEV L.P.	BOTTOM OF CURB BOTTOM OF WALL CENTER OF CURVE ELEVATION LOW POINT
H.P.	HIGH POINT
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PI	POINT OF INTERSECTION
PT	POINT OF TANGENCY
PRC	POINT OF REVERSE CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVC	POINT OF VERTICAL CURVATURE
PVT	POINT OF VERTICAL TANGENCY
R	RADIUS OF CURVATURE
S.S.D.	STOPPING SIGHT DISTANCE
STA	STATION
TC	TOP OF CURB
TW	TOP OF WALL

GENERAL SYMBOLS

EXISTING

SEE LEGEND ON EXISTING CONDITIONS PLAN C101



	DRAIN PIPE
s s	SEWER MAIN
S	SEWER MAIN BY P.C.
E E	ELECTRIC DUCT
TT	TELEPHONE/COMMUNICATIONS/FIRE ALARM
GW	GARAGE WASTE LINE
GW	GARAGE WASTE LINE BY P.C.
v	VENTS BY P.C.
G	GAS MAIN
W	WATER MAIN
—— онw ——	OVERHEAD WIRES
OR	GUARD RAIL (SIZE AND TYPE NOTED)

GUARD RAIL (SIZE AND TYPE NOTED)

HIGHWAY / PROPERTY BOUND (TYPE NOTED)

CITY OR TOWN OR COUNTY LAYOUT LINE

CITY,TOWN OR COUNTY BOUNDARY

BASE OR SURVEY LINE

CENTERLINE OF CONSTRUCTION

PROPERTY LINE

WHEELCHAIR RAMP (WCR)

TREE (SIZE AND TYPE NOTED)

ELECTRIC VEHICLE CHARGING STATION

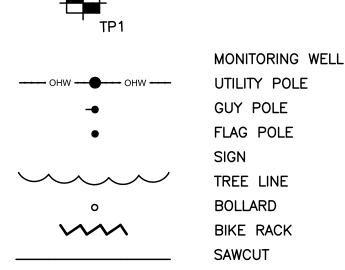
FENCE (SIZE AND TYPE NOTED)

TEST PIT

TEMPORARY FENCE

CONCRETE BOUND FOUND

TEMPORARY BENCHMARK (TBM)



TP-2

TREE LINE

BOLLARD

BIKE RACK

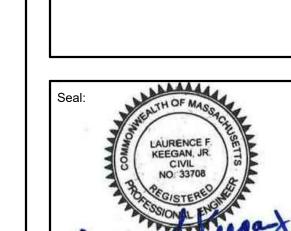
SAWCUT

EROSION CONTROL (SPECIFIED ON PLANS)

OBSERVATION WELL

LIMIT OF WORK

WETLAND BUFFER



TOWN OF ARLINGTON

PUBLIC WORKS FACILTI

RENOVATIONS & ADDITION

51 GROVE STREET

ARLINGTON, MA 02476

Weston & Sampsor

Weston & Sampson Engineers, Inc

100 Foxborough Boulevard Suite 250

Foxborough, MA 02035

(508) 698-3034 (800) SAMPSON

www.westonandsampson.com

Consultants:

Revisions: Rev Date Description		9	Romer	PEGISTERE SE
Rev Date Description	Rev Date Description	Revi	sions:	
- 		Rev	Date	Description
		\dashv		
 		\dashv		

Issued For: PERMITTING

SCALE: AS NOTED

Drawn By: EC

Reviewed By: LFK

Approved By: LFK

W&S Project No: 2170997

OCTOBER 21, 2020

Drawing Title:

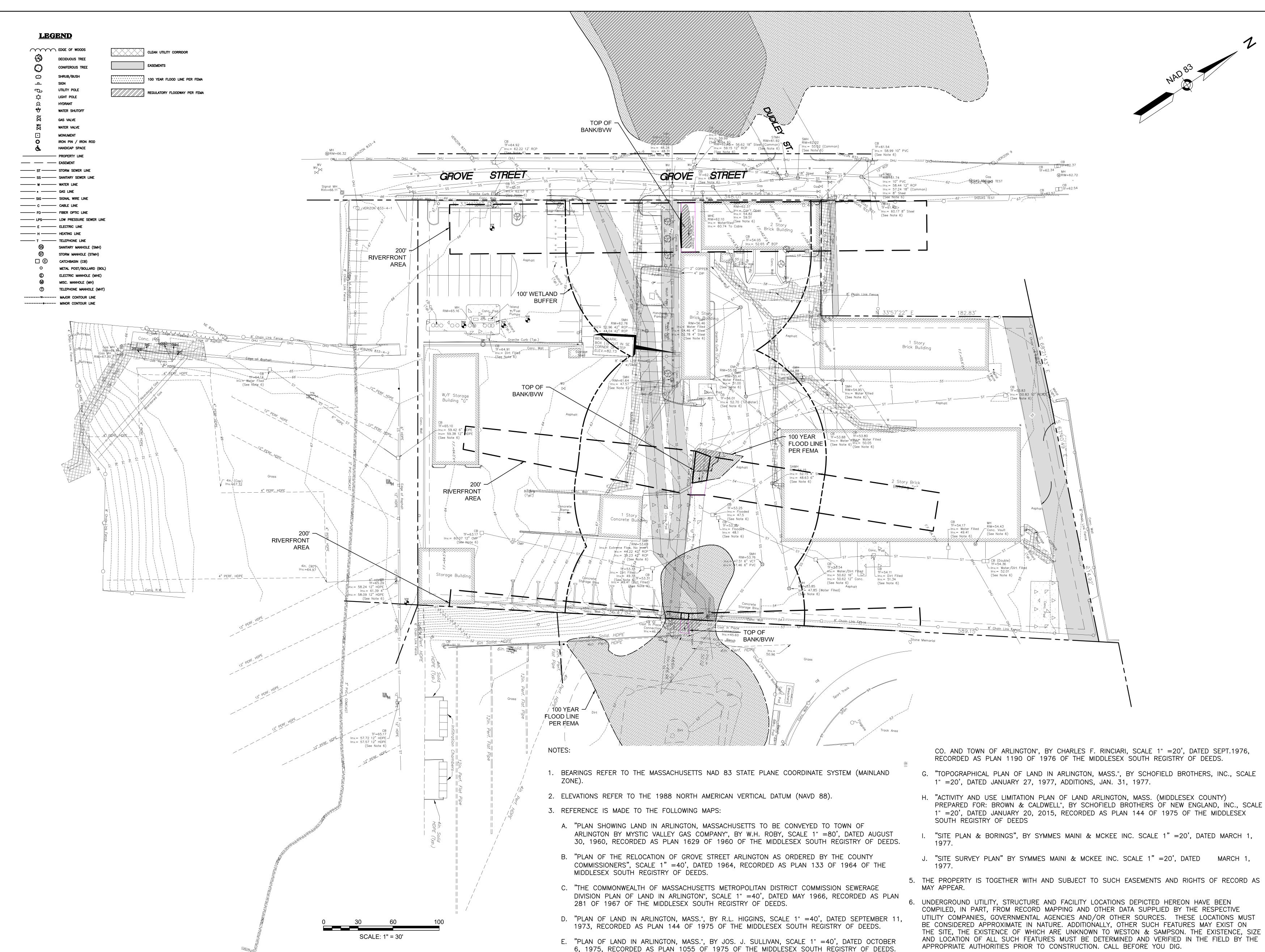
GENERAL NOTES AND LEGEND

Sheet Number:

C001

(FOR PERMIT REVIEW ONLY

WESTON & SAMPSON COPYRIGHT 2019



F. "PLAN OF LAND IN ARLINGTON - MASS. SHOWING PROPOSED TRANSFER OF LAND BETWEEN GAS 7. INVERTS NOT ATTAINABLE DO TO ICE OR OTHER DEBRIS RESTRICTING VISIBILITY AND OR ACCESS.

INVERTS WERE TAKEN FROM RECORD DRAWINGS LISTED AS 3(I) & 3(J) IN THE ABOVE NOTES AND

8. EXISTING CONDITIONS ARE SHOWN BASED ON EXISTING CONDITION SURVEY PREPARED BY WESTON &

CONVERTED TO NEW ELEVATION VALUES BASED ON NAVD 88 DATUM.

SAMPSON, DATED FEBRUARY 16, 2018.

TOWN OF ARLINGTON



PUBLIC WORKS FACILTIN RENOVATIONS & ADDITION 51 GROVE STREET ARLINGTON, MA 02476

Weston & Sampson Weston & Sampson Engineers, Inc. 100 Foxborough Boulevard Suite 250 Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON www.westonandsampson.com

Consultants:

Issued For: PERMITTING

SCALE: AS NOTED

OCTOBER 21, 2020

Reviewed By: LFK

W&S Project No: 2170997

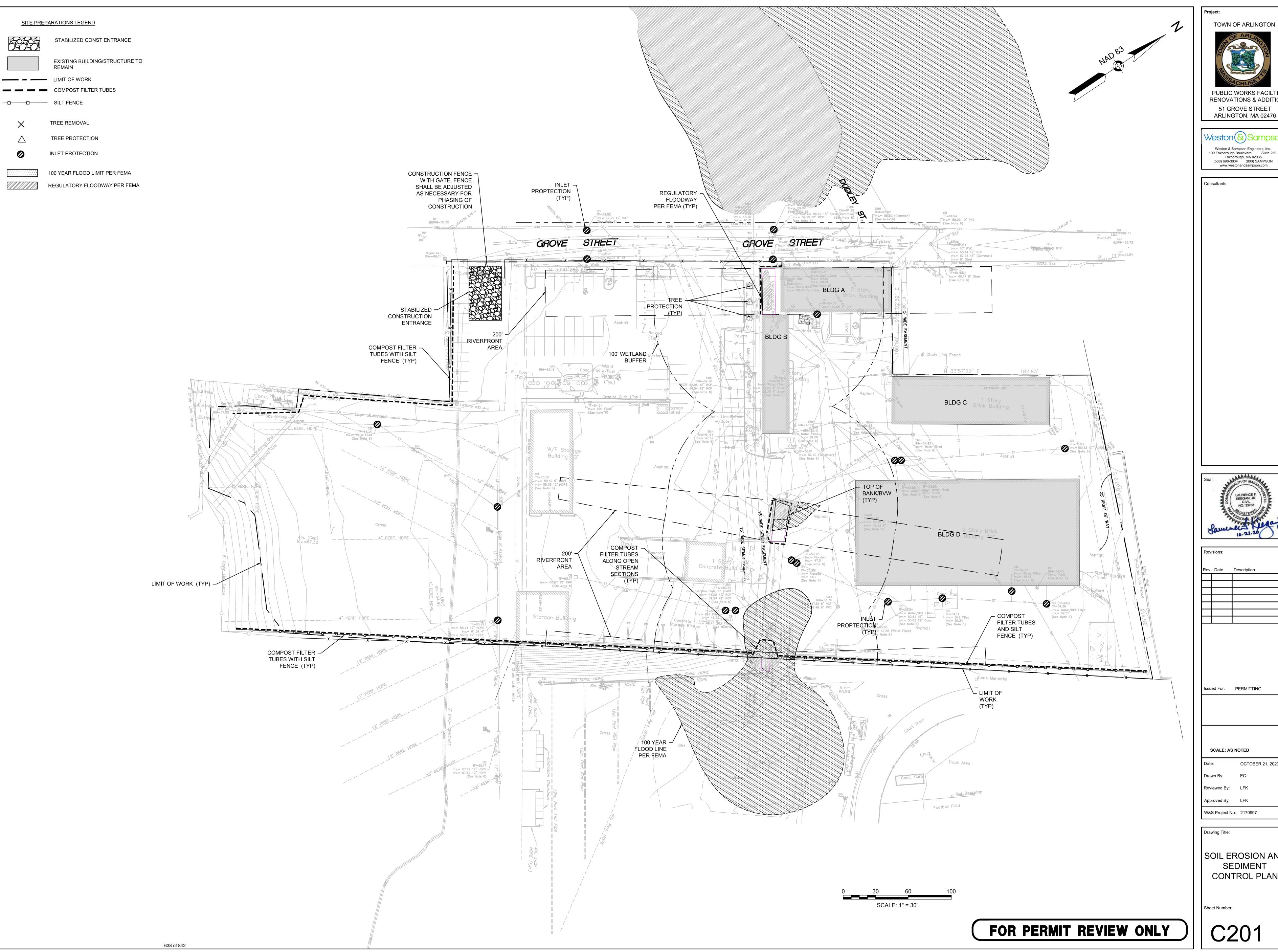
Drawing Title:

EXISTING CONDITIONS PLAN

Sheet Number:

C101

WESTON & SAMPSON COPYRIGHT 2019



TOWN OF ARLINGTON

PUBLIC WORKS FACILTIY **RENOVATIONS & ADDITION**

Weston & Sampson Weston & Sampson Engineers, Inc.

100 Foxborough Boulevard Suite 250
Foxborough, MA 02035
Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON

www.westonandsampson.com

51 GROVE STREET

Consultants:

Issued For: PERMITTING

SCALE: AS NOTED

OCTOBER 21, 2020

W&S Project No: 2170997

SOIL EROSION AND SEDIMENT CONTROL PLAN

Sheet Number:

639 of 842

TOWN OF ARLINGTON

PUBLIC WORKS FACILTIY **RENOVATIONS & ADDITION**

Weston & Sampsor Weston & Sampson Engineers, Inc. 100 Foxborough Boulevard Suite 250 Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON

Revisions:

Rev Date Description

Issued For: PERMITTING

SCALE: AS NOTED OCTOBER 21, 2020

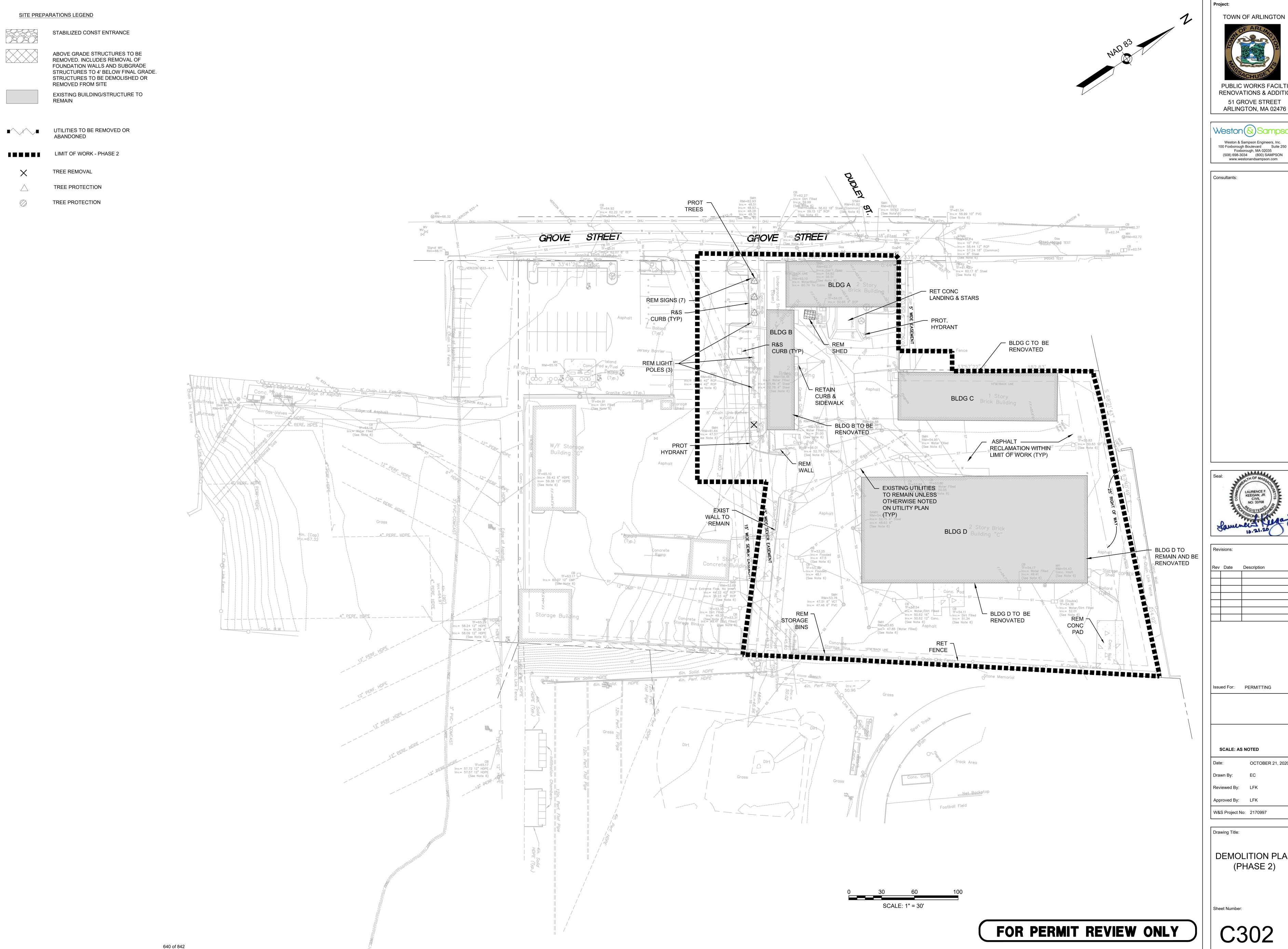
Drawn By: Reviewed By: LFK

Approved By: LFK

W&S Project No: 2170997

DEMOLITION PLAN (PHASE 1)

Sheet Number:



TOWN OF ARLINGTON

PUBLIC WORKS FACILTIY **RENOVATIONS & ADDITION** 51 GROVE STREET

Weston & Sampson Weston & Sampson Engineers, Inc.

100 Foxborough Boulevard Suite 250
Foxborough, MA 02035
Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON www.westonandsampson.com

Revisions:		
Rev Date	Description	

Rev Date Description

Issued For: PERMITTING

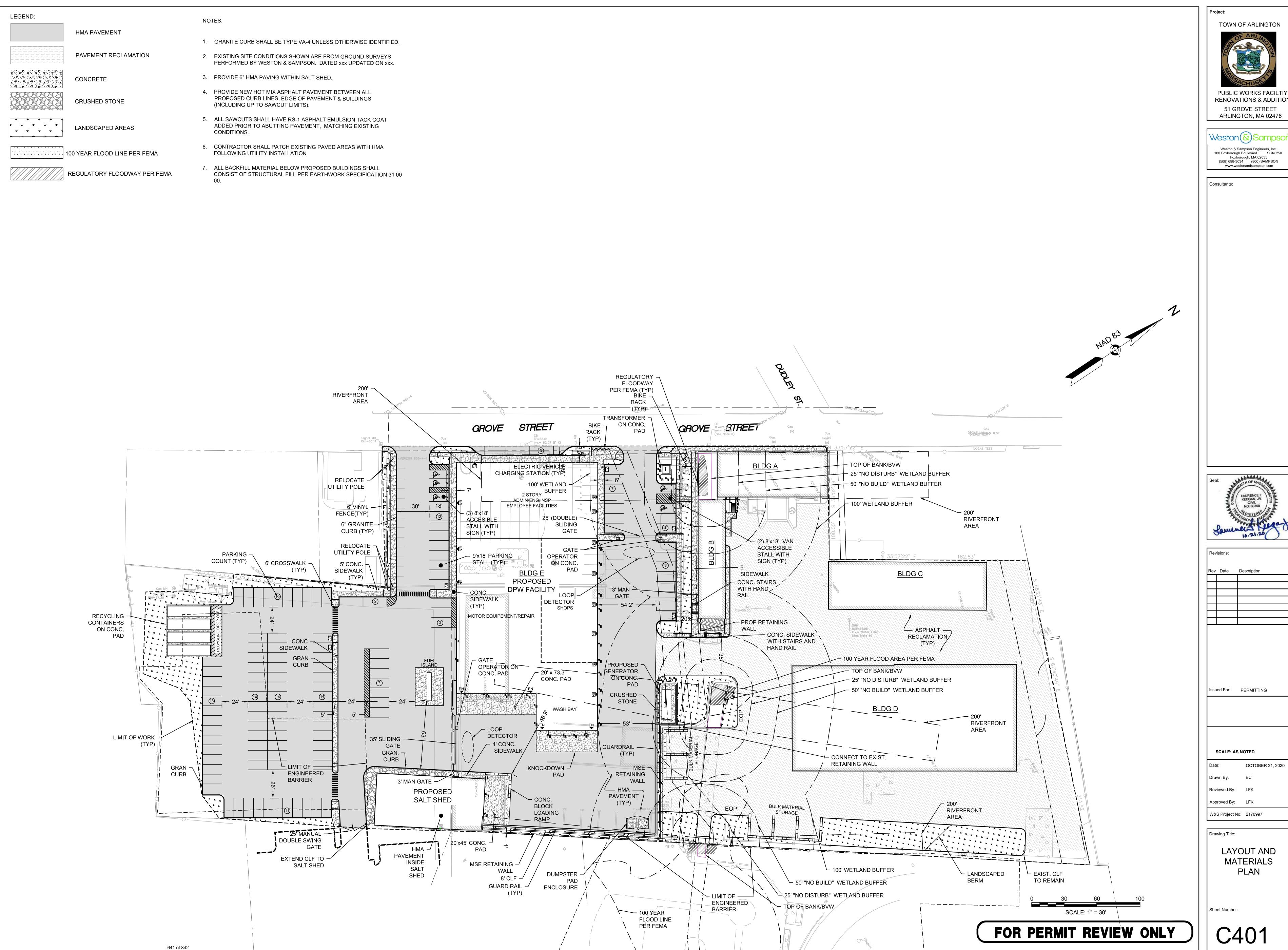
OCTOBER 21, 2020

Approved By: LFK

W&S Project No: 2170997

DEMOLITION PLAN (PHASE 2)

Sheet Number:



TOWN OF ARLINGTON PUBLIC WORKS FACILTIY

RENOVATIONS & ADDITION 51 GROVE STREET ARLINGTON, MA 02476

Consultants:

www.westonandsampson.com

Issued For: PERMITTING

SCALE: AS NOTED

OCTOBER 21, 2020 Drawn By:

Reviewed By: LFK Approved By: LFK

W&S Project No: 2170997

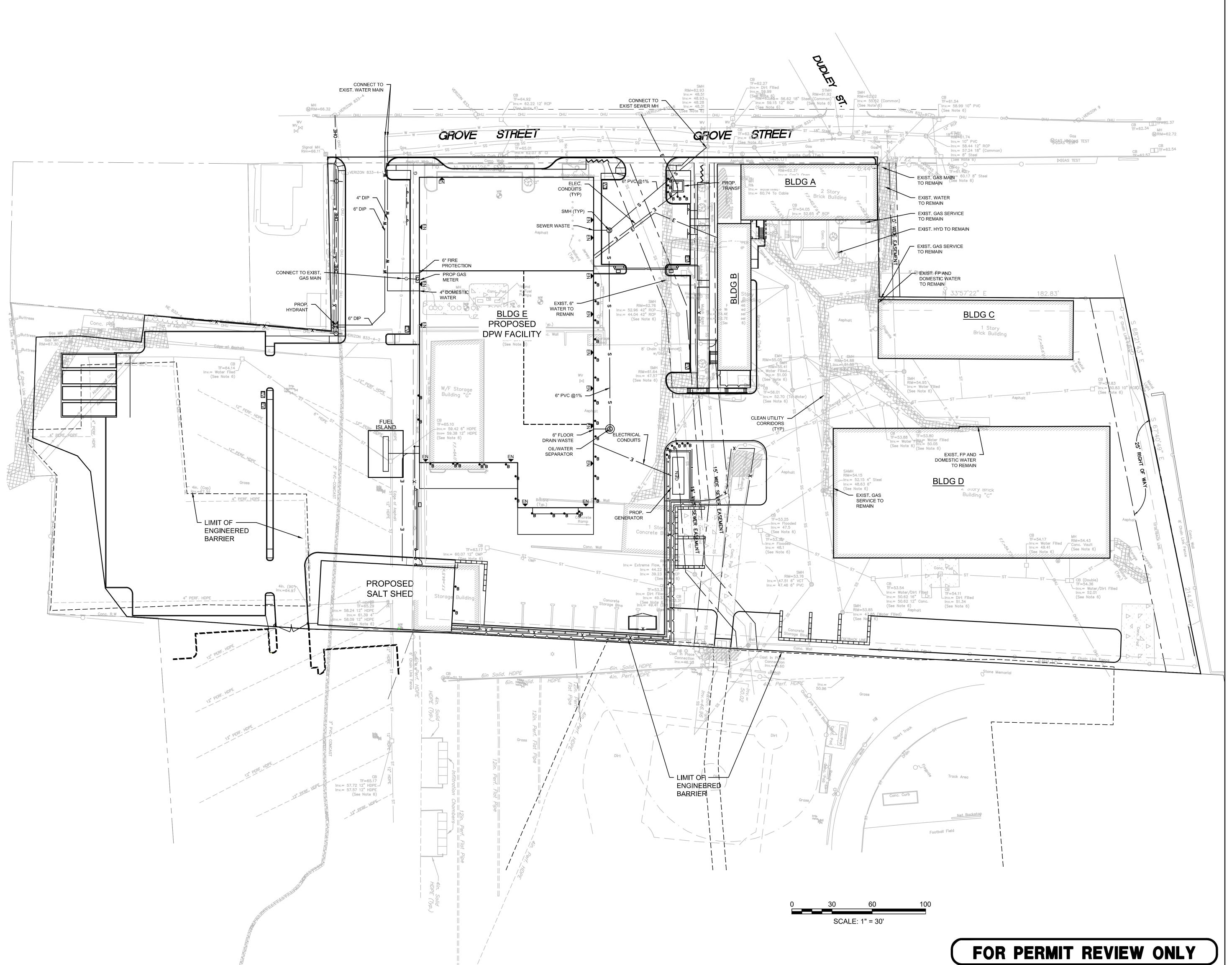
LAYOUT AND **MATERIALS** PLAN

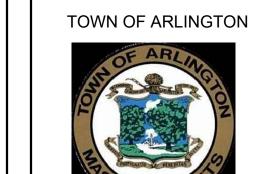
Sheet Number:

C401

WESTON & SAMPSON COPYRIGHT 2019

- THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE G.C. SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE G.C. FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE G.C. AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
- 2. THE G.C. SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY OWNER.
- 3. THE G.C. IS RESPONSIBLE FOR ADJUSTING HORIZONTAL AND VERTICAL ALIGNMENT OF PROPOSED UTILITIES AS REQUIRED TO COMPLETE THE PROPOSED DRAINAGE AND SEWER WORK.
- 4. THE G.C. TO PROVIDE ALL NECESSARY FITTINGS TO ACHIEVE WATER SERVICE LAYOUT AS SHOWN ON THE DRAWINGS.
- 5. GENERAL CONTRACTOR (G.C) IS RESPONSIBLE FOR PROVIDING PROPER TRANSITION MATERIAL AND FITTINGS TO PROVIDE A TIGHT TRANSITION FROM DISSIMILAR PIPE MATERIALS FROM PLUMBING & FIRE PROTECTION WORK TO G.C. WORK.
- 6. P.C. IS RESPONSIBLE FOR THE CONSTRUCTION OF THE DOMESTIC WATER LINES & SANITARY SERVICES INSIDE THE BUILDING AND EXTENDING 10' FROM THE FACE OF THE BUILDING WHERE IT EXITS UNLESS OTHERWISE NOTED. THE G.C. IS RESPONSIBLE FOR EXTENDING NEW SERVICE INTO THE SITE AND FOR CONNECTION TO THE PLUMBING CONTRACTOR'S
- 7. P.C. SHALL PROVIDE & INSTALL THE OIL/WATER/SAND SEPARATOR (OWS) SYSTEM. P.C SHALL PROVIDE & INSTALL ALL SANITARY AND VENT PIPING FROM THE BUILDING TO THE STRUCTURE. G.C. SHALL EXCAVATE & BACKFILL FOR ALL EXTERIOR PIPING AND OIL/WATER SEPARATOR.
- 8. G.C. IS RESPONSIBLE FOR EXCAVATION, BACKFILL, CONCRETE ENCASEMENT, AND REINFORCEMENT FOR ALL UNDERGROUND CONDUITS/DUCTBANKS, HANDHOLES, PLUMBING, AND FIRE PROTECTION WORK . COORDINATE LIMITS OF WORK WITH FP, P, E, AND TC DRAWINGS FOR WORK NOT SHOWN ON THIS DRAWING.
- THE FIRE PROTECTION (FP) CONTRACTOR IS RESPONSIBLE FOR FOR THE CONSTRUCTION OF THE FIRE PROTECTION SERVICE INSIDE THE BUILDING AND EXTENDING 10' OUTSIDE FROM THE FACE OF THE BUILDING (SEE FP-SERIES DRAWINGS). G.C. IS RESPONSIBLE FOR EXTENDING NEW SERVICE INTO THE SITE AND FOR CONNECTION TO THE FIRE PROTECTION CONTRACTOR'S WORK.
- 10. ALL UNDERGROUND WORK SHALL BE COORDINATED WITH THE FINAL PLANTING PLAN TO AVOID PLANTINGS FROM BEING INSTALLED OVER NEW UTILITIES.
- 11. LIGHT POLE CONDUITS ARE NOT SHOWN FOR CLARITY. REFER TO E-SERIES DRAWINGS FOR LIGHT POLE CONDUIT AND ROUTING. G.C. TO PROVIDE & INSTALL LIGHT POLE FOUNDATIONS & E.C. TO PROVIDE AND INSTALL LIGHT POLES. G.C. TO EXCAVATE AND BACKFILL FOR ALL CONDUITS. E.C. TO PROVIDE AND INSTALL CONDUITS.
- 12. CONDUITS FOR AUTOMATIC GATES AND LOOP DETECTORS NOT SHOWN. COORDINATE QUANTITY AND LOCATION WITH E-SERIES DRAWINGS. E.C TO PROVIDE AND INSTALL CONDUITS. G.C. TO EXCAVATE AND BACKFILL FOR CONDUITS.
- 13. DRAINAGE INFORMATION IN GRAY IS SHOWN FOR ILLUSTRATIVE AND COORDINATION PURPOSE. SEE C6.01-C6.03 GRADING AND DRAINAGE PLANS FOR DRAINAGE INFORMATION.
- 14. G.C. IS RESPONSIBLE FOR EXCAVATION AND BACKFILL FOR ALL UNDERGROUND UTILITIES WITHIN THE BUILDING. COORDINATE LOCATIONS, ROUTING, DEPTH, ETC. WITH EACH SUBCONTRACTOR.
- 15. THE G.C. SHALL BE RESPONSIBLE FOR THE SAWCUTTING, EXCAVATION, SAND PIPE BEDDING, BACKFILL, AND TRENCH PATCHING OF THE GAS LINE. THE PIPE INSTALLATION WILL BE THE RESPONSIBILITY OF THE GAS COMPANY FROM THE MAIN TO THE METER. THE GAS COMPANY WILL DETERMINE IN THE FIELD THE EXACT LOCATION FOR PROPER CONNECTION TO THE EXISTING GAS MAIN. G.C. SHALL EXCAVATE & BACKFILL FOR GAS LINE ACCORDINGLY.





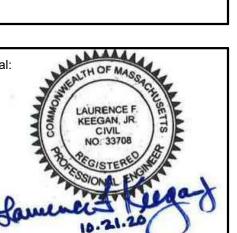


Weston & Sampsor Weston & Sampson Engineers, Inc. 100 Foxborough Boulevard Suite 250 Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON www.westonandsampson.com

51 GROVE STREET

ARLINGTON, MA 02476

Consultants:



Revisions: Rev Date Description

Issued For: PERMITTING

SCALE: AS NOTED

OCTOBER 21, 2020 Drawn By: Reviewed By: LFK

Approved By: LFK W&S Project No: 2170997

UTILITY PLAN

Sheet Number:

C501

642 of 842

LEGEND: 100 YEAR FLOOD LINE PER FEMA REGULATORY FLOODWAY PER FEMA HDPE (HIGH DENSITY POLYETHYLENE). 2. UNLESS OTHERWISE NOTED, ALL DRAIN MANHOLES SHALL BE 4'

1. UNLESS OTHERWISE NOTED ALL DRAIN PIPES SHALL BE 12"

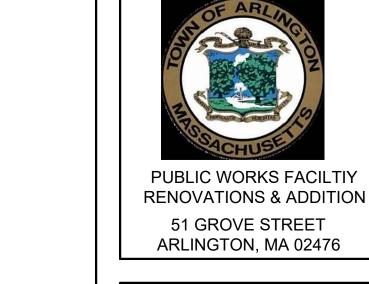
- INSIDE DIAMETER.
- 3. ALL RIM ELEVATIONS SHALL BE FLUSH WITH FINISH GRADE.
- 4. DUMPSTER PAD SHALL SLOPE AT A MINIMUM 2% INTO THE PAVED AREA.
- 5. FOR THE PROPOSED ROOF DRAIN LINES, THE CONTRACTOR SHALL INSTALL CLEAN OUTS AT THE END OF THE PIPE LINE, AT ANY LOCATION WHERE THE PIPE CHANGES DIRECTIONS, AND AT A 100 FOOT INTERVALS AS NEEDED. CLEANOUTS LOCATED IN PAVED AREAS SHALL BE INSTALLED TO PROVIDE H-20 WHEEL LOADING RATING.
- 6. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
- 7. THE CONTRACTOR SHALL INSTALL SILT SACKS ON ALL PROPOSED INLETS FOR THE DURATION OF CONSTRUCTION AND INSPECT THE CATCH BASINS AFTER EACH RAIN EVENT. THE SEDIMENT FROM SEDIMENT TRAPS SHALL BE REMOVED WHEN DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT. SILT SACKS SHALL BE REMOVED ONCE THE SITE IS PERMANENTLY STABILIZED AT THE END OF CONSTRUCTION.

PIPE TABLE				
PIPE	PIPE LOCATION	SIZE & TYPE	LENGTH	SLOPE
P-1	CB-1 TO SWTU-1	12" HDPE	101 LF	0.005
P-2	SWTU-1 TO DET-1	12" HDPE	8 LF	0.009
P-3	DET-1 TO OCS-1	12" HDPE	5 LF	0.000
P-4	OCS-1 TO DMH-3	12" HDPE	76 LF	0.007
P-5	DMH-3 TO DMH-4	12" HDPE	54 LF	0.005
P-7	DMH-5 TO DMH-6	12" HDPE	26 LF	0.005
P-8	DMH-6 TO SWTU-1	12" HDPE	32 LF	0.005
P-9	CB-2 TO DMH-6	12" HDPE	8 LF	0.007
P-10	DBCB-1 TO DMH-5	12" HDPE	15 LF	0.006
P-11	CB-4 TO DMH-5	12" HDPE	62 LF	0.025

PIPE TABLE				
PIPE	PIPE LOCATION	SIZE & TYPE	LENGTH	SLOPE
P-12	SWTU-5 TO DS-34	12" HDPE	13 LF	0.005
P-13	CB-6 TO DMH-7	12" HDPE	32 LF	0.005
P-14	DMH-7 TO SWTU-3	12" HDPE	68 LF	0.010
P-15	SWTU-3 TO DMH-9	12" HDPE	13 LF	0.080
P-16	DMH-9 TO DMH-10	12" HDPE	41 LF	0.080
P-17	DBCB-2 TO SWTU-3	12" HDPE	8 LF	0.048
P-18	CO-1 TO DMH-11	12" HDPE	185 LF	0.020
P-19	DMH-11 TO SWTU-3	12" HDPE	37 LF	0.020
P-20	CB-7 TO DMH-11	12" HDPE	31 LF	0.005
P-21	CO-2 TO CO-3	12" HDPE	146 LF	0.010

PIPE TABLE				
PIPE	PIPE LOCATION	SIZE & TYPE	LENGTH	SLOPE
P-23	CO-4 TO DMH-7	12" HDPE	56 LF	0.018
P-24	SWTU-4 TO DMH-12	12" HDPE	27 LF	0.005
P-25	CB-9 TO SWTU-1	12" HDPE	17 LF	0.004
P-27	TO DMH-3	12" HDPE	19 LF	0.005
P-28	CB-11 TO	12" HDPE	11 LF	0.005
P-29	CO-3 TO DS-34	12" HDPE	21 LF	0.010
P-30	DS-34 TO DET-1	12" HDPE	25 LF	0.010

	PIPE TABLE				
IPE	PIPE LOCATION	SIZE & TYPE	LENGTH	SLOPE	
P-23	CO-4 TO DMH-7	12" HDPE	56 LF	0.018	
P-24	SWTU-4 TO DMH-12	12" HDPE	27 LF	0.005	
-25	CB-9 TO SWTU-1	12" HDPE	17 LF	0.004	
P-27	TO DMH-3	12" HDPE	19 LF	0.005	
P-28	CB-11 TO	12" HDPE	11 LF	0.005	
-29	CO-3 TO DS-34	12" HDPE	21 LF	0.010	
9-30	DS-34 TO DET-1	12" HDPE	25 LF	0.010	
	_				



Weston & Sampson Engineers, Inc. 100 Foxborough Boulevard Suite 250 Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON www.westonandsampson.com

TOWN OF ARLINGTON

Consultants:



Issued For: PERMITTING

SCALE: AS NOTED

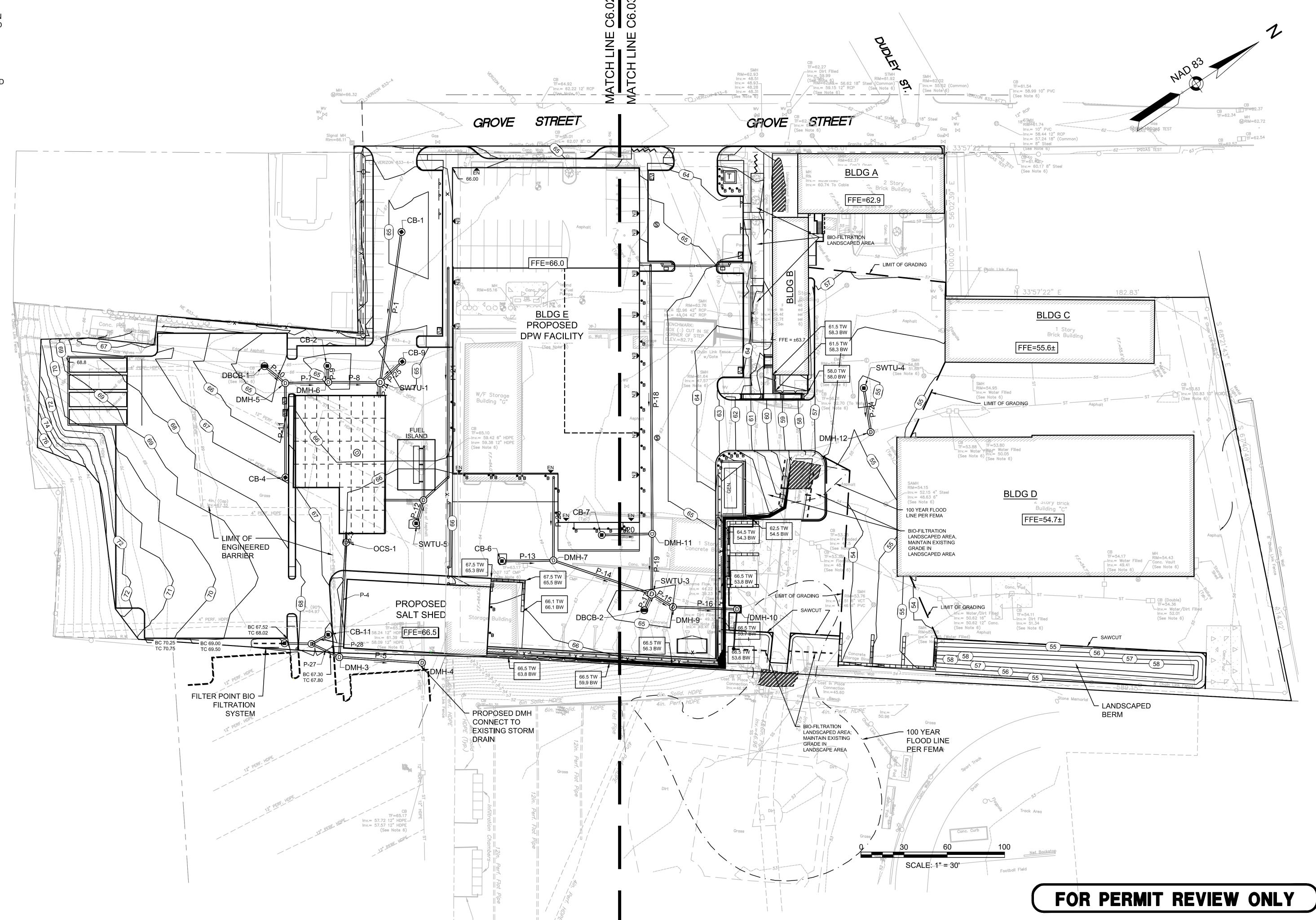
OCTOBER 21, 2020 Drawn By:

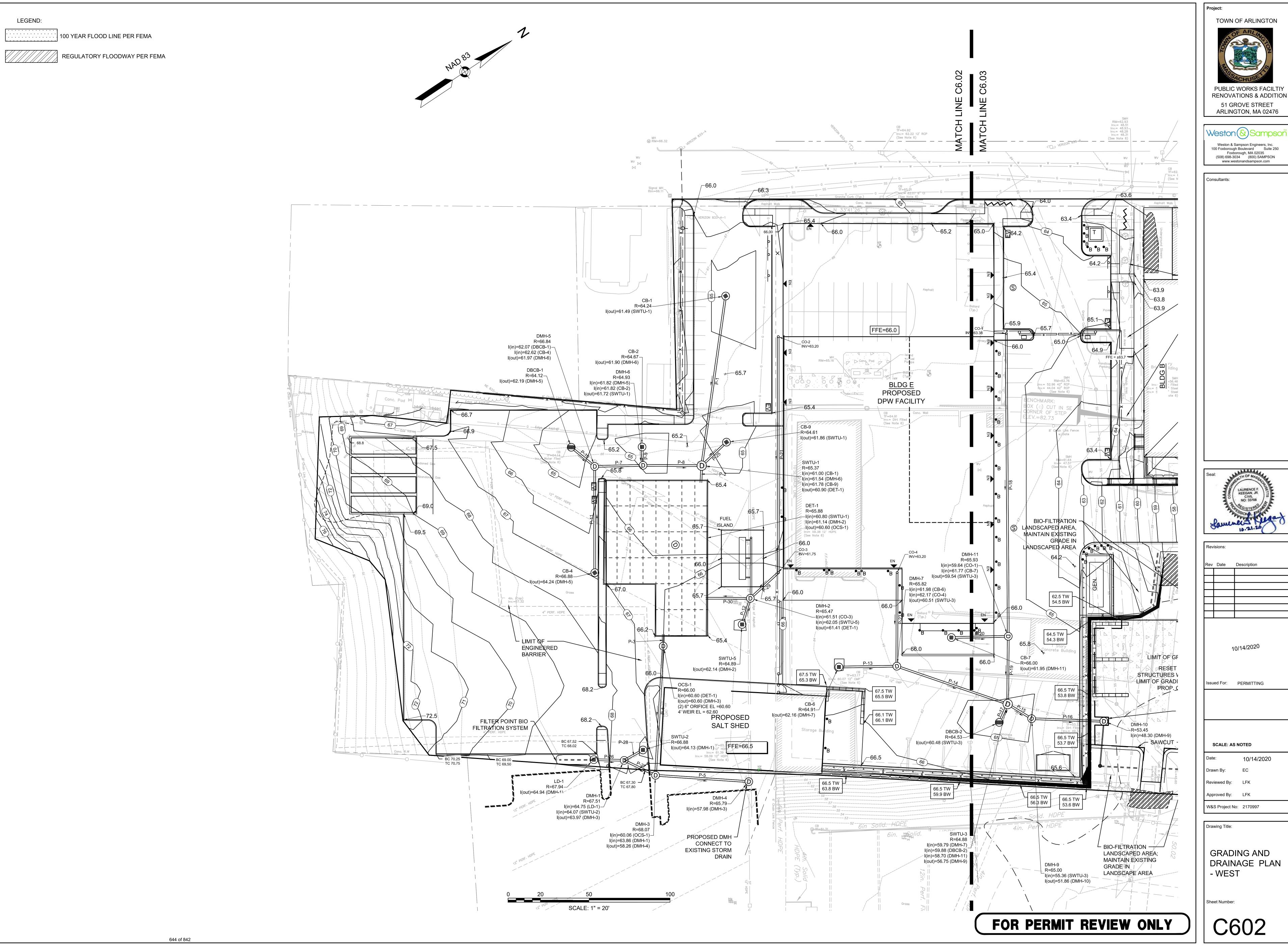
Reviewed By: LFK

W&S Project No: 2170997

GRADING AND DRAINAGE PLAN -OVERALL

Sheet Number:





TOWN OF ARLINGTON

51 GROVE STREET ARLINGTON, MA 02476

1	0/14/2020

Issued For: PERMITTING

SCALE: AS NOTED

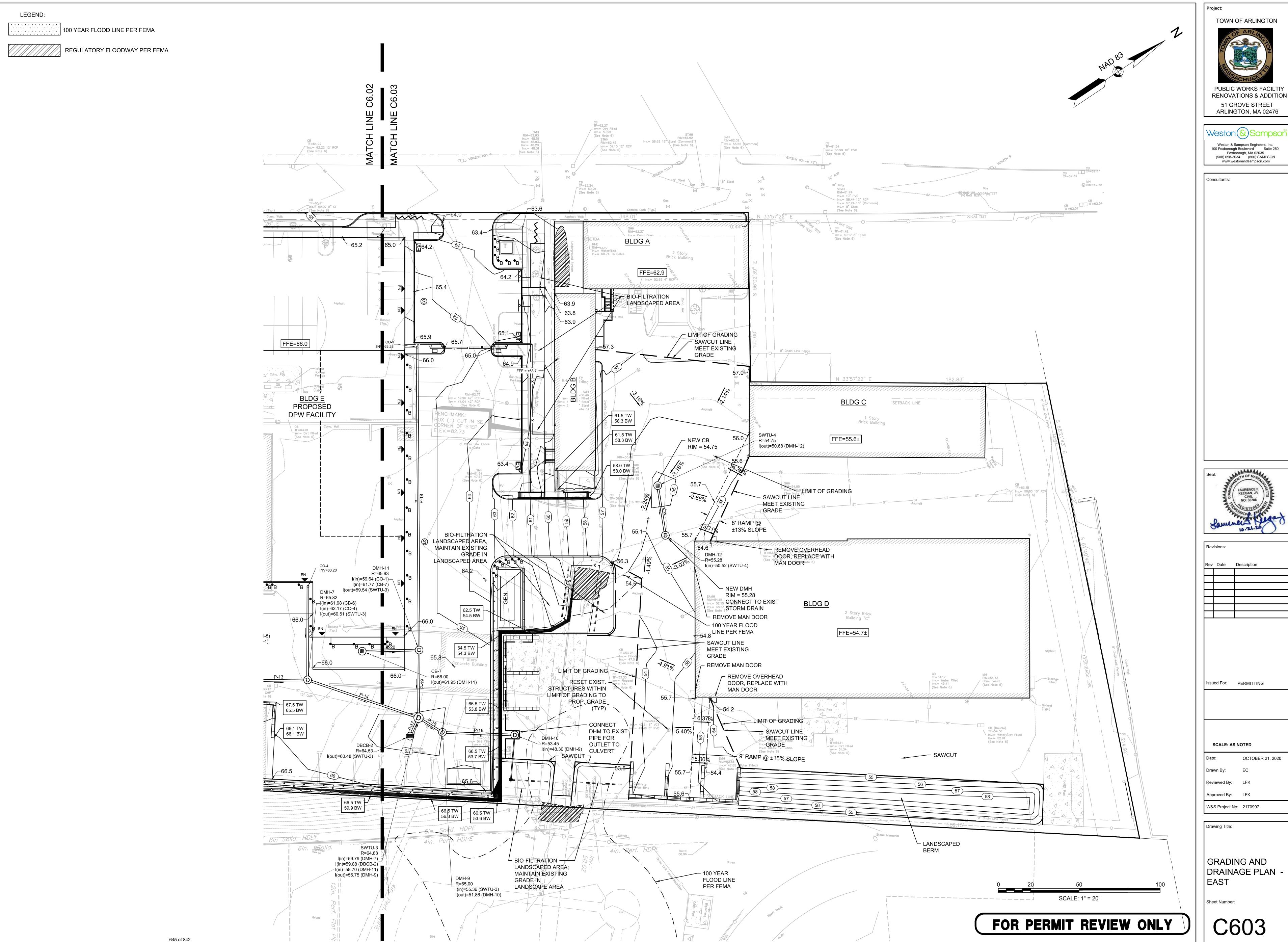
10/14/2020 Reviewed By: LFK

W&S Project No: 2170997

GRADING AND DRAINAGE PLAN

C602

WESTON & SAMPSON COPYRIGHT 2019



TOWN OF ARLINGTON

Weston & Sampson Engineers, Inc.

100 Foxborough Boulevard Suite 250
Foxborough, MA 02035

1101	isions:	
Rev	Date	Description
		•

Issued For: PERMITTING

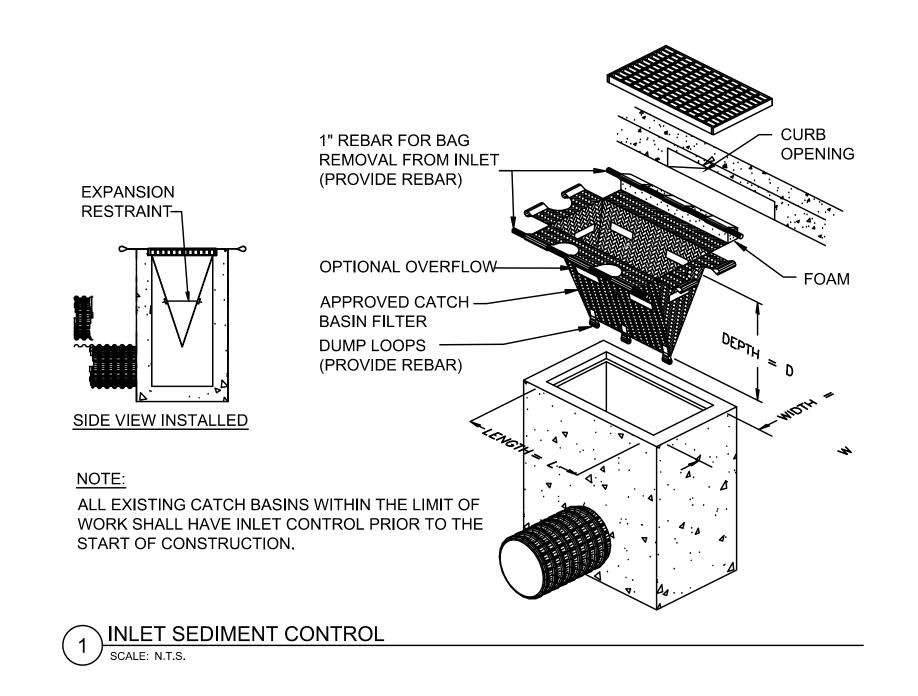
OCTOBER 21, 2020

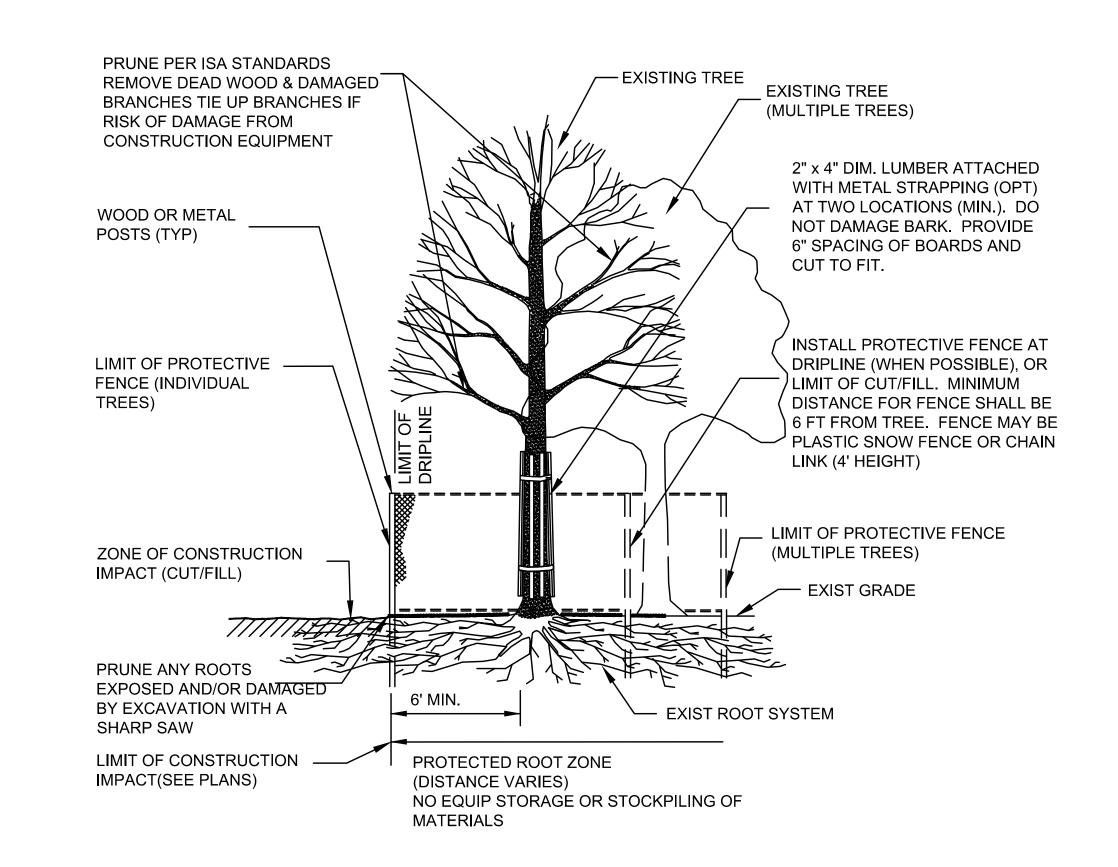
W&S Project No: 2170997

GRADING AND DRAINAGE PLAN -

C603

WESTON & SAMPSON COPYRIGHT 2019





EXISTING TREE PROTECTION

SCALE: N.T.S.

Ç DRIVE 24 FEET MIN. R=6' MIN. R=6' MIN. **GUTTER LINE**

PLAN

NOTES:

SCALE: N.T.S.

PROVIDE A 3 FT. MINIMUM OVERLAP AT ENDS OF TUBES

STAKE JOINING TUBES SNUGLY AGAINST EACH OTHER TO

SECURE ENDS OF TUBES WITH STAKES SPACED 18 IN.

TO JOIN IN A CONTINUOUS BARRIER AND MINIMIZE

PREVENT UNFILTERED FLOW BETWEEN THEM.

APART THROUGH TOPS OF TUBES.

UNTREATED HARDWOOD STAKE (TYP.)

— COMPOST FILTER TUBE (TYP.)

- LOOSE COMPOST LAYER

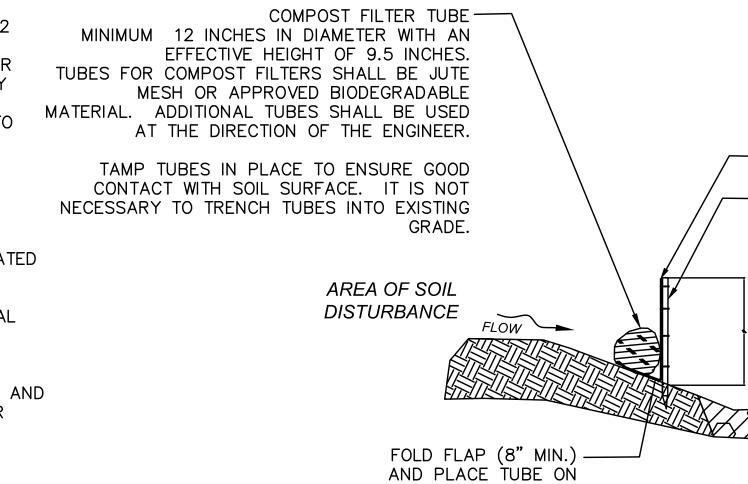
UNIMPEDED FLOW.

- 1. AT LEAST ONE CONSTRUCTION ENTRANCE SHALL BE PLACED AT EACH OF THE SITE, THROUGHOUT CONSTRUCTION.
- 2. THE LOCATION OF THE CONSTRUCTION ENTRANCE(S) SHALL BE APPROVED BY THE OWNER PRIOR TO PLACEMENT.
- 3. CONSTRUCTION ENTRANCE(S) SHALL CONSIST OF 2" CRUSHED STONE PLACED AT A DEPTH OF A MINIMUM 8 INCHES PLACED OVER GEOTEXTILE FABRIC.
- 4. CONTRACTOR IS RESPONSIBLE FOR CLEARING OF ALL VEGETATION, ROOTS AND ALL OBSTRUCTIONS IN PREPARATION FOR GRADING AND COMPACTING PRIOR TO PLACEMENT OF GEOTEXTILE FABRIC AND CRUSHED STONE.
- 5. CONTRACTOR IS RESPONSIBLE FOR DAILY INSPECTION AND ALL NECESSARY MAINTENANCE OF ALL ENTRANCES.
- 6. CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF SEDIMENTS OR ANY OTHER MATERIALS TRACKED ONTO THE STREET, AS WELL MAINTENANCE OF EROSION CONTROL MEASURES.
- STABILIZED TEMPORARY CONSTRUCTION ENTRANCE

GENERAL NOTES:

- PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES FOR SLOPES UP TO 50 FEET IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H: 1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
- 2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
- 3. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
- 4. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORMWATER RUN-OFF.
- 5. MULCH MATERIAL FOR THE FILTER TUBES SHALL BE WEED-FREE STRAW, WOOD EXCELSIOR, COMPOST, OR WOOD CHIPS, OR COIR. STRAW SHALL BE WEED FREE AND DERIVED FROM THRESHING OF GRAIN CROP.
- 6. CURVE ENDS UPHILL TO PREVENT DIVERSION OF UNFILTERED RUN-OFF.

646 of 842



TOP. DO NOT TRENCH

FABRIC.

WOVEN — POLYPROPYLENE FIBER FABRIC — 2 INCH X 2 INCH X 3 FEET UNTREATED HARDWOOD STAKES, UP TO 5 FT. APART OR AS REQUIRED TO SECURE TUBES IN PLACE. WHEN STAKING IS NOT POSSIBLE, SUCH AS WHEN TUBES MUST BE PLACED ON PAVEMENT, HEAVY CONCRETE OR CINDER BLOCKS CAN BE USED BEHIND TUBES UP TO 5 FT. APART OR AS REQUIRED TO SECURE TUBES IN PLACE. PROTECTED ZONE

<u>PLAN VIEW - JOINING DETAIL</u>

DIRECTION OF FLOW

PROTECTED AREA

6 EROSION CONTROL MEASURE :SINGLE COMPOST FILTER TUBE WITH SILT FENCE DETAIL SCALE: N.T.S.

FOR PERMIT REVIEW ONLY

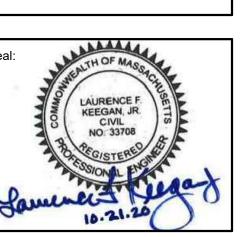
PUBLIC WORKS FACILTIY RENOVATIONS & ADDITION 51 GROVE STREET

TOWN OF ARLINGTON

Weston & Sampsor Weston & Sampson Engineers, Inc. 100 Foxborough Boulevard Suite 250 Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON www.westonandsampson.com

ARLINGTON, MA 02476

Consultants:



7	Same	EL TIESO 10.21.20
Rev	isions:	
Rev	Date	Description

Issued For: PERMITTING

OCTOBER 21, 2020

Drawn By: Reviewed By: LFK

Approved By: LFK

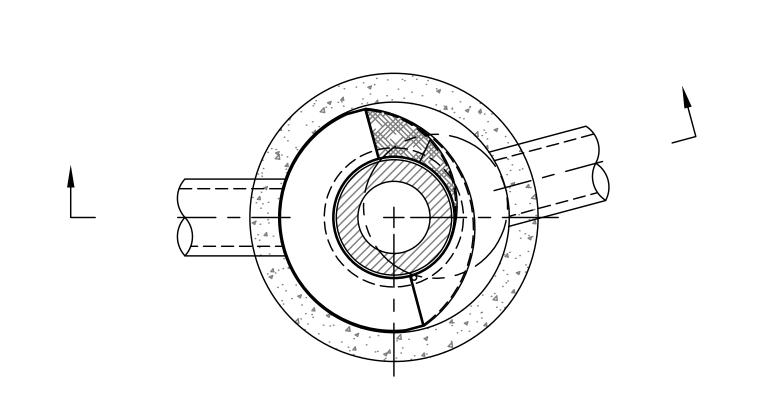
W&S Project No: 2170997

SCALE: AS NOTED

Drawing Title:

DETAILS

Sheet Number:

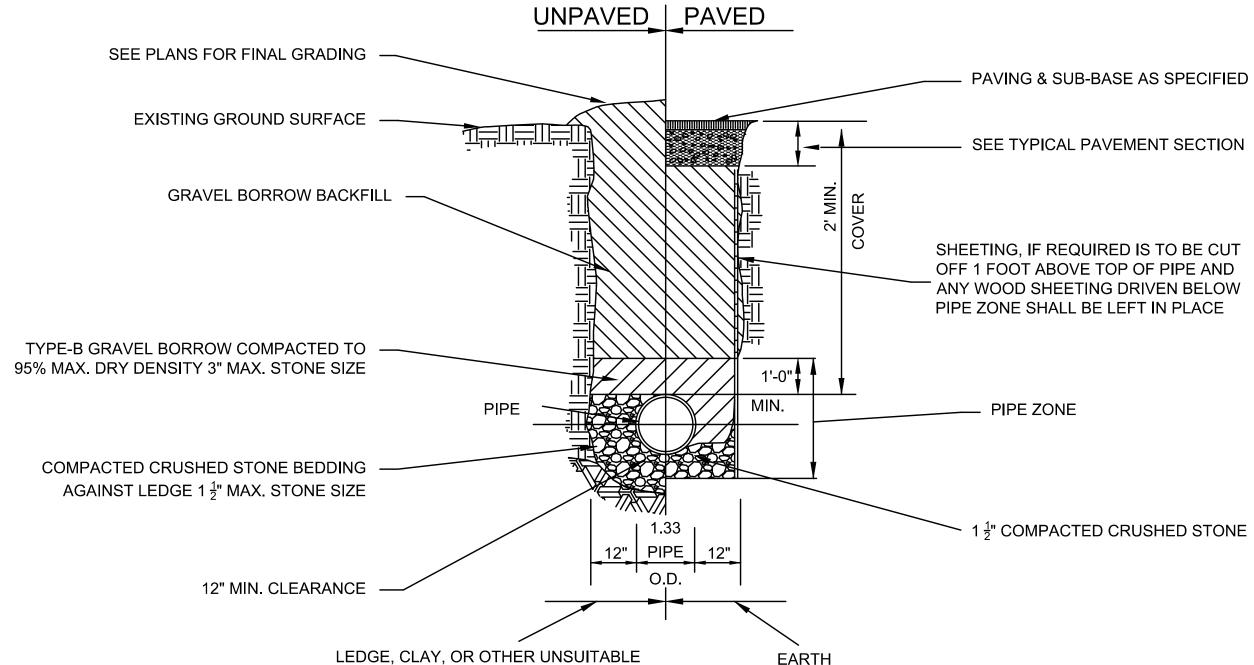


NOTES:

EQUAL

- DIMENSIONS MARKED WITH () ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY. 2. WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND
- INFORMATION CONTAINED IN THE SPECIFICATIONS.
- 3. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET AASHTO M306 LOAD
- 4. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE SWTU MANHOLE STRUCTURE.
- 5. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE
- 6. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE
- INVERTS BE GROUTED. 7. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. SEE SHEET C601-C603 FOR
- LOCATION, MATERIAL AND INVERT DATA. 8. STORMWATER TREATMENT STRUCTURE SHALL BE STORMCEPTOR STC 450 OR APPROVED

STORMWATER TREATMENT UNIT (SWTU) SCALE: N.T.S.



MATERIAL

3 TYPICAL H.D.P.E DRAIN TRENCH DETAIL SCALE: N.T.S.

STANDARD -

8" MIN. –

MORTAR ALL JOINTS

MORTAR FILL ─\

PROVIDE "V"

OPENING (TYP)

6 STANDARD DRAINAGE MANHOLE

OUTSIDE OF PIPE +

2" CLEARANCE (TYP)

SCALE: N.T.S.

PROPOSED

DIR OF FLOW

COVER

OR 48" (DBL CB

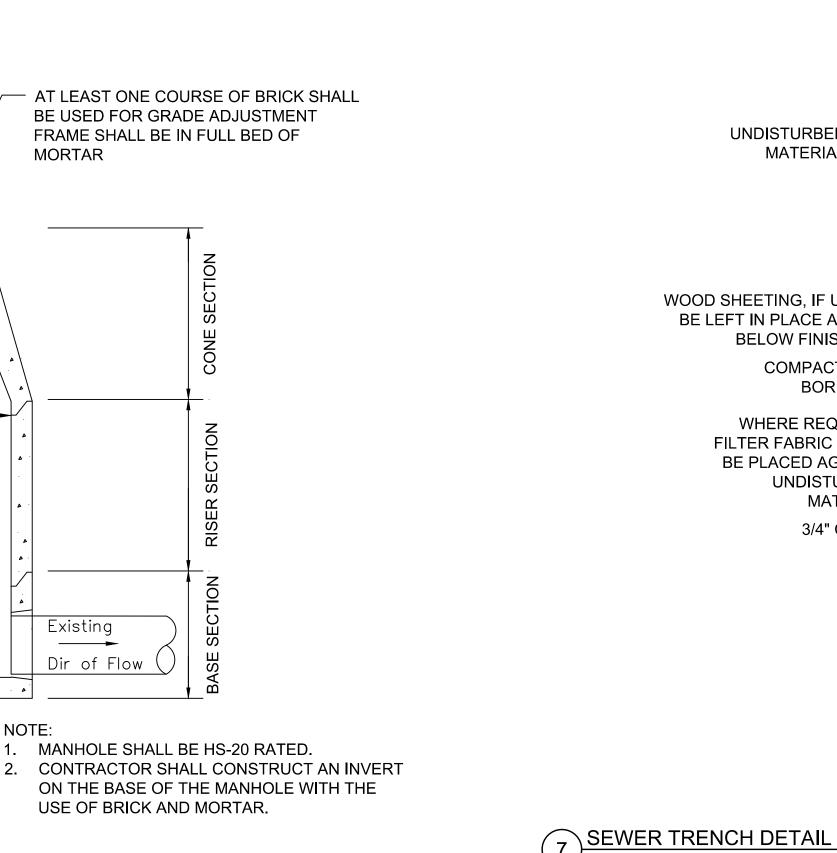
WITH FLAT TOP)

48"± 1" DIA.

OR 60"± 1" DIA. (DBL CB)

→ 6" MIN. (BLOCK) 5"

MIN (PRECAST)



SCALE: N.T.S.

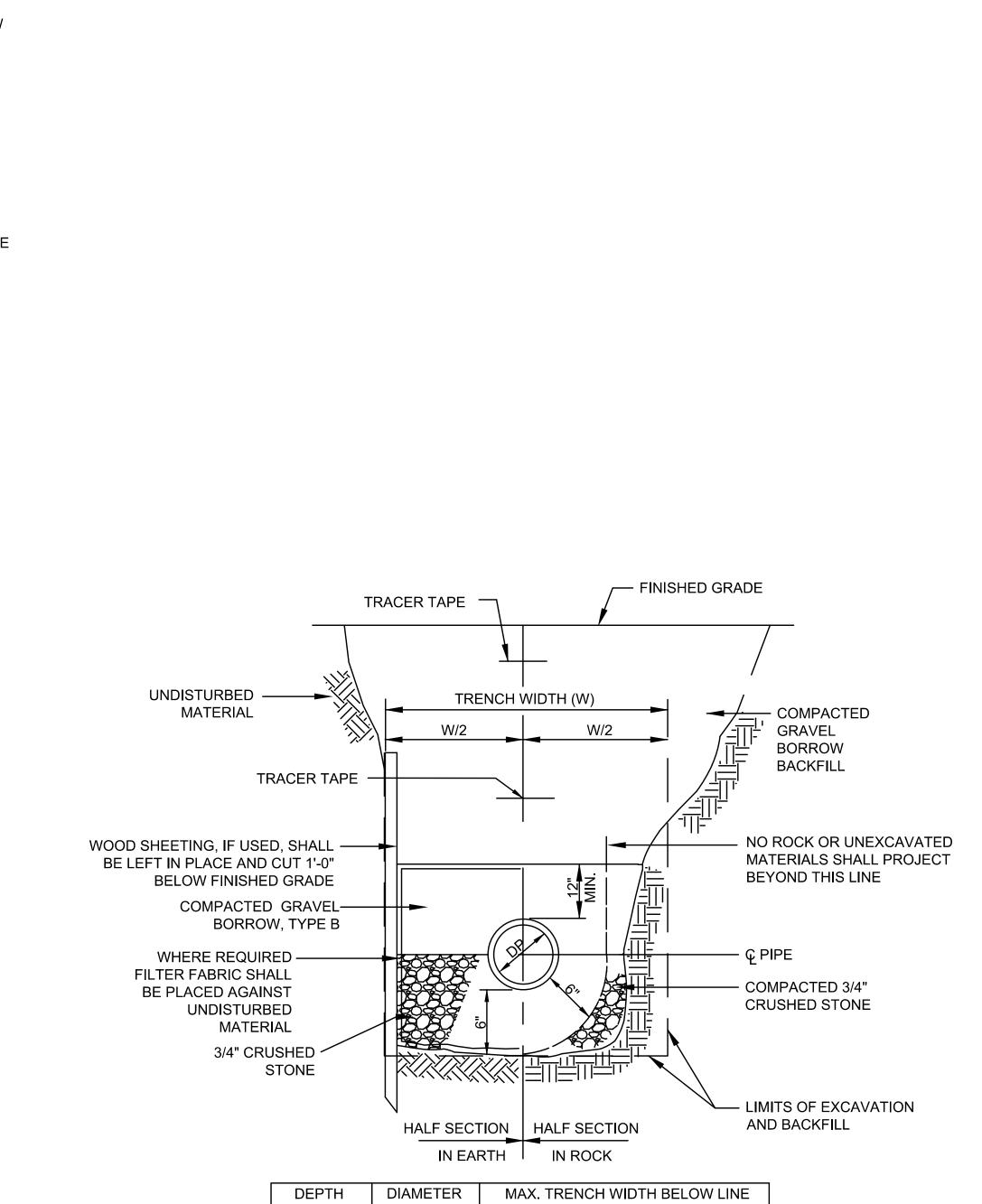
FRAME SHALL BE IN FULL BED OF

MORTAR

Existing

Dir of Flow (

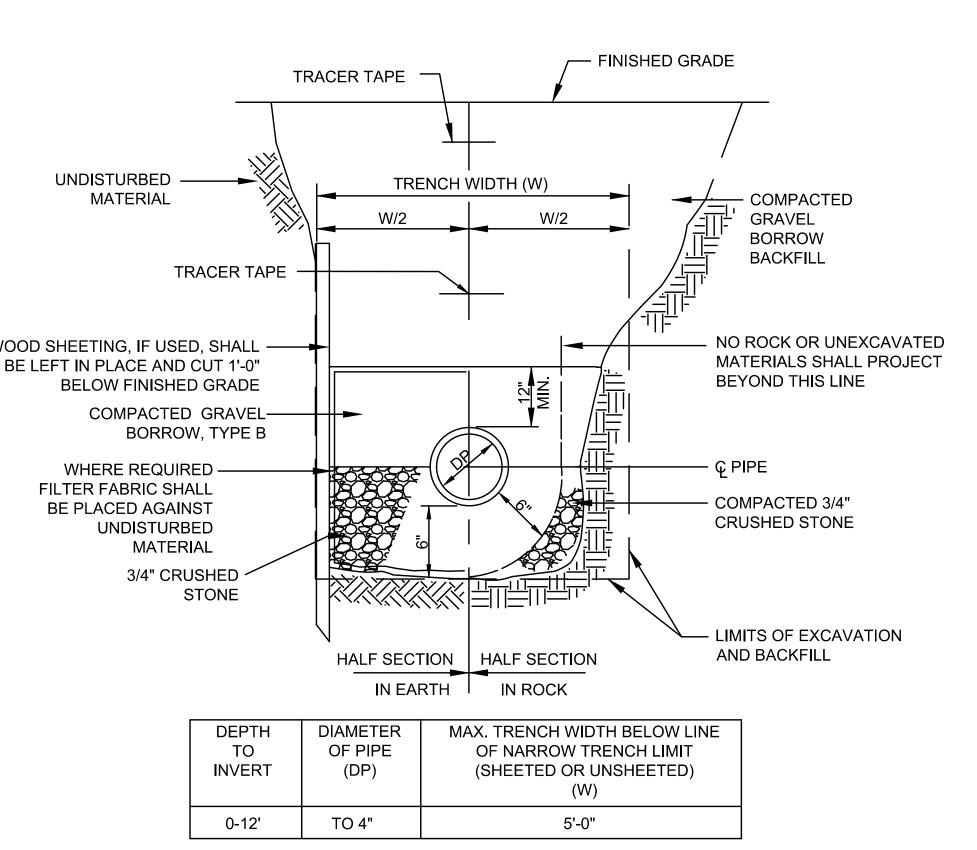
USE OF BRICK AND MORTAR.

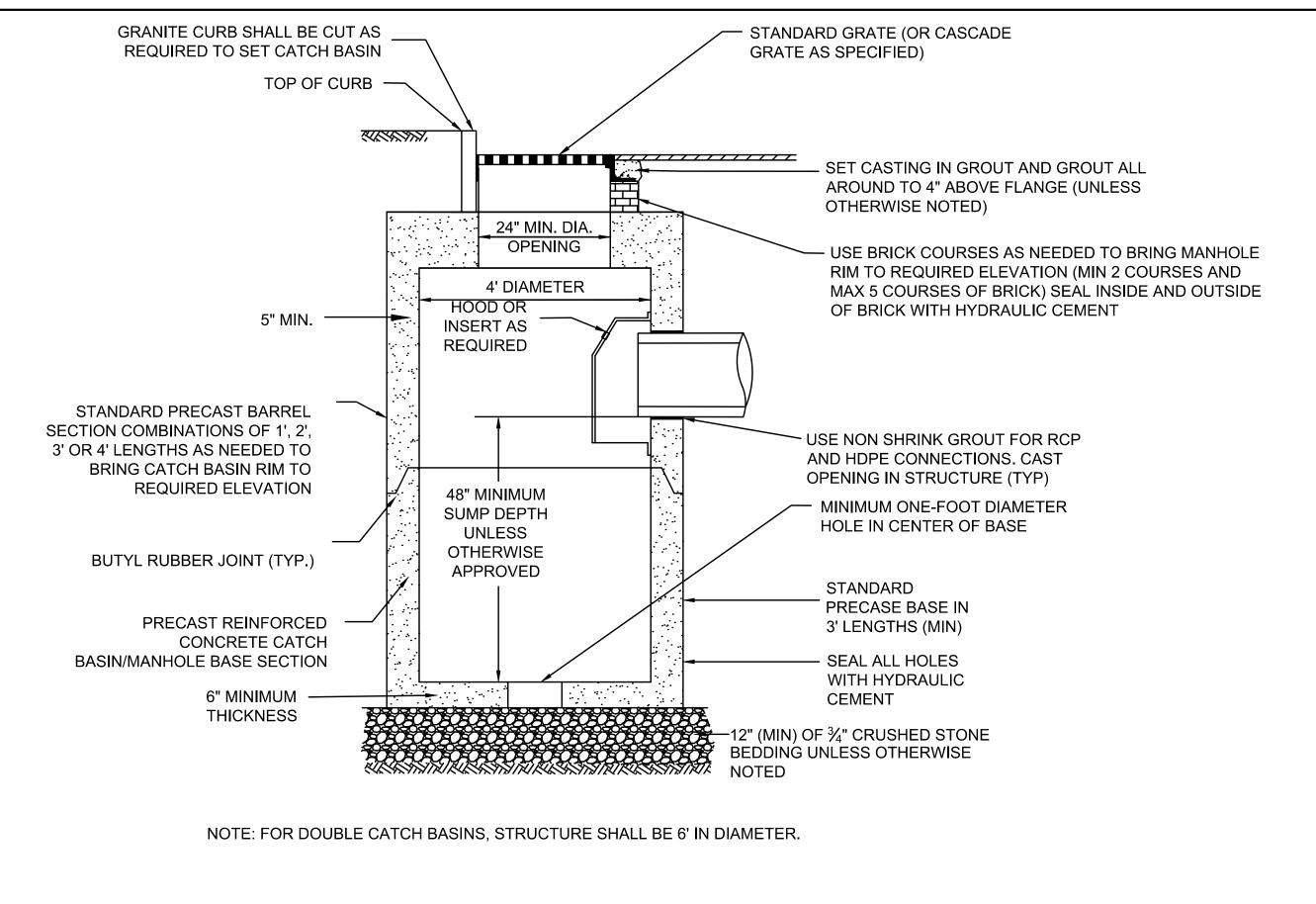


— COVER AND/OR GRATE

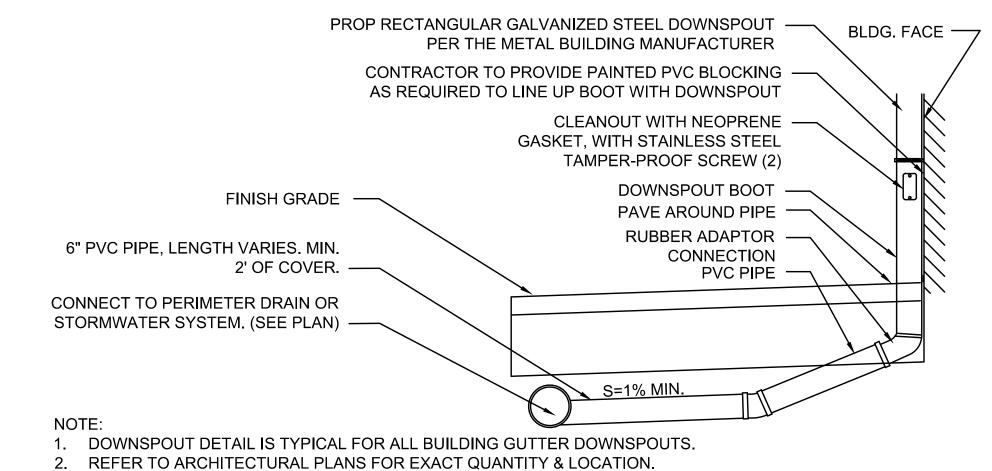
- - - - - -

 \Rightarrow





STANDARD CATCH BASIN



3. COORDINATE WITH CIVIL SITE PLANS FOR CONNECTIONS TO STORM SYSTEM

4. PROVIDE A DOWNSPOUT BOOT AT EACH DOWNSPOUT TO ALLOW THE RECTANGULAR

DOWNSPOUT TO TRANSITION TO THE ROUND RECEPTOR PIPE. 5. PAINT DOWNSPOUT ADAPTER BY PAINTING SUBCONTRACTOR. COLOR AS SELECTED

BY THE ENGINEER. 6. DOWNSPOUT ADAPTER SHALL BE MANUFACTURED BY PIEDMONT MANUFACTURING

OR APPROVED EQUAL. 5 GUTTER DOWNSPOUT CONNECTION DETAIL (EXTERNAL)
SCALE: N.T.S.

> STAINLESS STEEL STRAP PIPE SECTION **EXPANDED** STAINLESS STEEL RING - RUBBER SLEEVE PRECAST CONCRETE TANK OR MANHOLE

8 PIPE SEAL DETAIL SCALE: N.T.S.

FOR PERMIT REVIEW ONLY

TOWN OF ARLINGTON

PUBLIC WORKS FACILTIY **RENOVATIONS & ADDITION** 51 GROVE STREET ARLINGTON, MA 02476

Weston & Sampson Engineers, Inc. 100 Foxborough Boulevard Suite 250 Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON www.westonandsampson.com

Consultants:

Revisions: Rev Date Description

Issued For: PERMITTING

SCALE: AS NOTED

OCTOBER 21, 2020

Drawn By: Reviewed By: LFK

Approved By: LFK

W&S Project No: 2170997

Drawing Title:

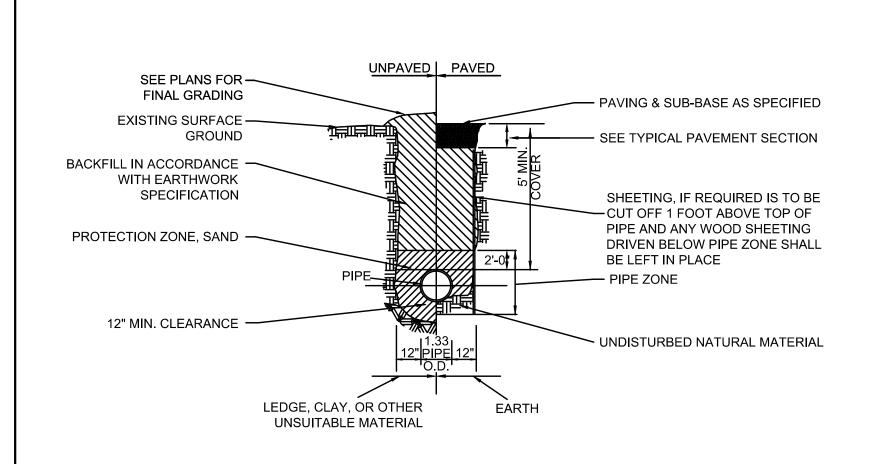
DETAILS

Sheet Number: C802

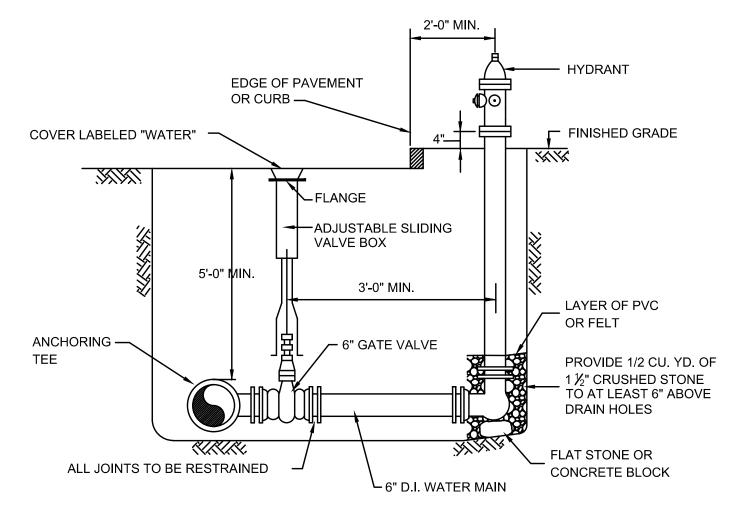
WESTON & SAMPSON COPYRIGHT 2019

5" PRECAST OR —

SECTIONAL PLATES



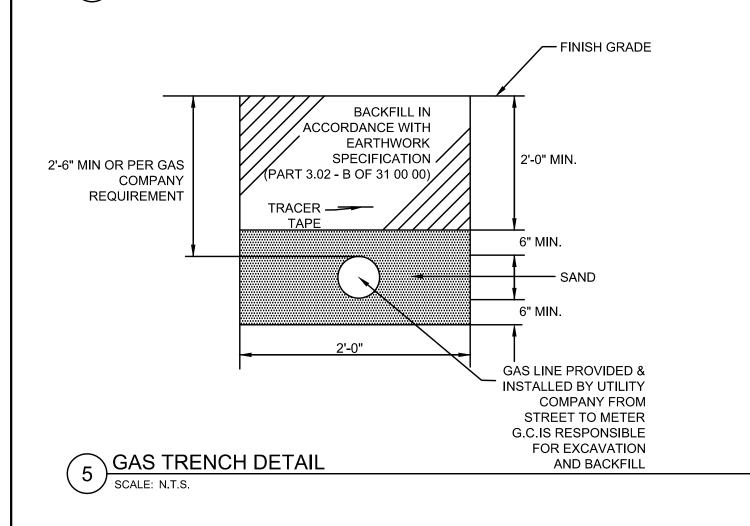
TYPICAL WATER TRENCH DETAIL



<u>NOTES</u>

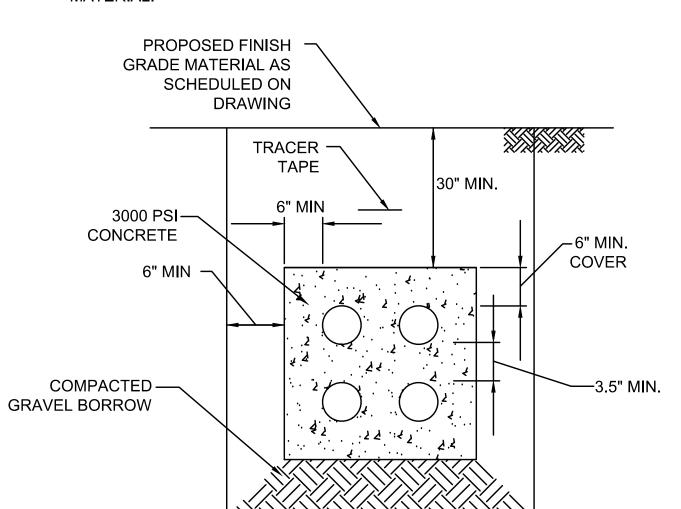
- 1. HYDRANT GATE VALVE TO BE LOCATED WITHIN ROADWAY PAVEMENT WHERE
- POSSIBLE.
 2. GATES VALVES SHALL BE AWWA RESILIENT SEAT GATE VALVES.
- 3. USE TWO 6" BENDS OR OFFSET ON LATERAL TO ACHIEVE REQUIRED HYDRANT ELEVATION IF NECESSARY.

3 HYDRANT AND VALVE DETAIL SCALE: N.T.S.

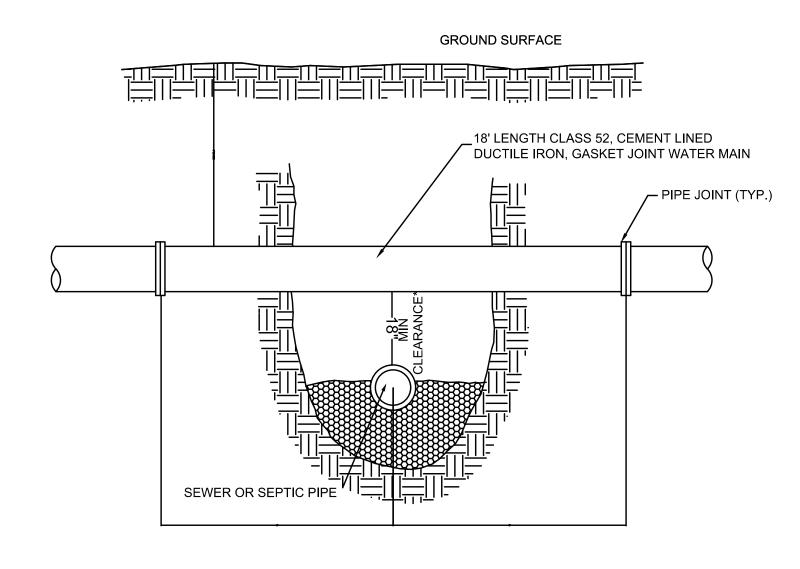


NOTES

- G.C. IS RESPONSIBLE FOR EXCAVATION, CONCRETE ENCASEMENT, REINFORCEMENT AND BACKFILL. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND INSTALLING THE CONDUITS & SPACERS.
- 2. PROVIDE REINFORCEMENT PER LOCAL UTILITY COMPANY REQUIREMENTS. REFER TO E501 FOR DETAILS.
- 3. QUANTITY & SIZE OF CONDUITS VARY. DUCTBANK SIZE SHALL BE ADJUSTED BASED ON CONDUIT TYPES & SIZES IDENTIFIED ON THE E-SERIES DRAWINGS.
- CONTRACTOR SHALL COORDINATE DEPTH OF PROPOSED DUCTBANK WITH PROPOSED UTILITY & DRAINAGE SYSTEMS TO AVOID CONFLICTS.
- BACKFILL AROUND DUCTBANK WITH GRAVEL BORROW BACKFILL MATERIAL.

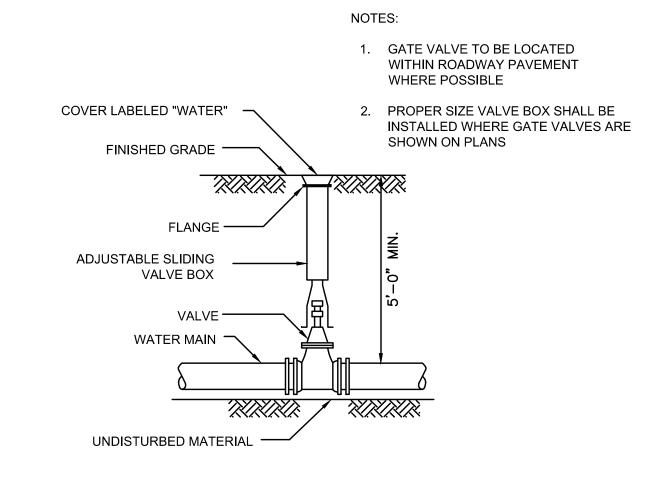


7 ELECTRIC/COMMUNICATION DUCTBANK DETAIL

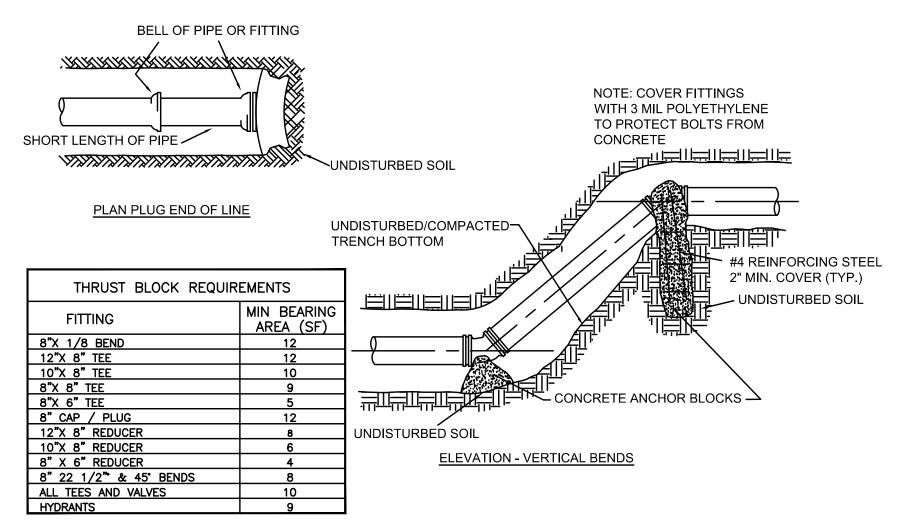


*WHEN THE CROSSING AS SHOWN IS LESS THAN 18" VERTICAL CLEARANCE THE UTILITY BEING INSTALLED MUST BE SLEEVED 10' ON BOTH SIDES OF THE CROSSING WITH SDR35 PVC PIPE. IF THE SEWER MAIN OR SERVICE CROSSES ABOVE THE WATER MAIN OR SERVICE, AGAIN THE UTILITY BEING INSTALLED MUST BE SLEEVED 10' ON BOTH SIDES OF THE CROSSING WITH SDR35 PVC PIPE.





4 VALVE AND BOX DETAIL SCALE: N.T.S.



6 ANCHORAGE DETAILS SCALE: N.T.S.

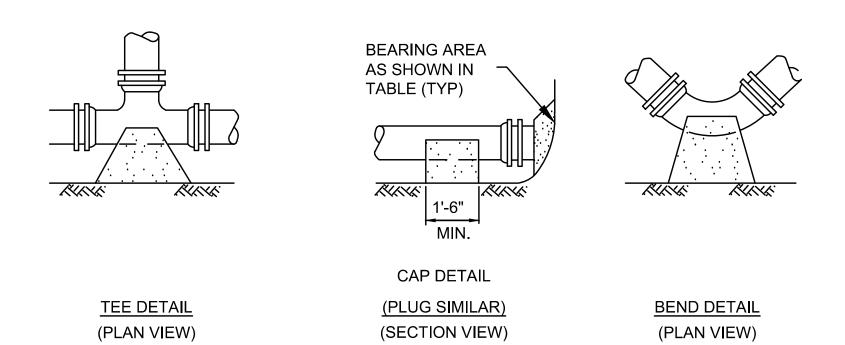


TABLE OF CONCRETE THRUST RESTRAINT MINIMUM BEARING AREAS IN SQUARE							
FEET AGAINST UNDISTURBED MATERIAL FOR WATER MAIN FITTINGS							
SIZE OF MAIN	90° BENDS, TEES, CAPS AND PLUGS	45° BENDS AND WYES	22-1/2° BENDS	11-1/4° BENDS			
6", 8"	5	4	2	2			
10", 12"	12	9	5	2			
16"	20	15	8	4			
20"	36	24	13	7			

NOTES: 1. ALL WATER MAIN FITTINGS SHALL HAVE CONCRETE BACKING FOR 2. CONTRACTOR SHALL USE CARE TO AVOID PLACEMENT OF

8 CONCRETE THRUST RESTRAINT FOR FITTINGS
SCALE: N.T.S.

FOR PERMIT REVIEW ONLY

PUBLIC WORKS FACILTIY
RENOVATIONS & ADDITION
51 GROVE STREET
ARLINGTON, MA 02476

Weston Sampson Engineers, Inc.

100 Foxborough Boulevard Suite 250
Foxborough, MA 02035
(508) 698-3034 (800) SAMPSON
www.westonandsampson.com

Consultants:

LAURENCE F
KEEGAN, JR
CIVIL
NO: 33708

REGISTERE

Revisions:

Rev Date Description

Issued For: PERMITTING

SCALE: AS NOTED

Date: OCTOBER 21, 2020

Drawn By: EC

Reviewed By: LFK

Approved By: LFK

W&S Project No: 2170997

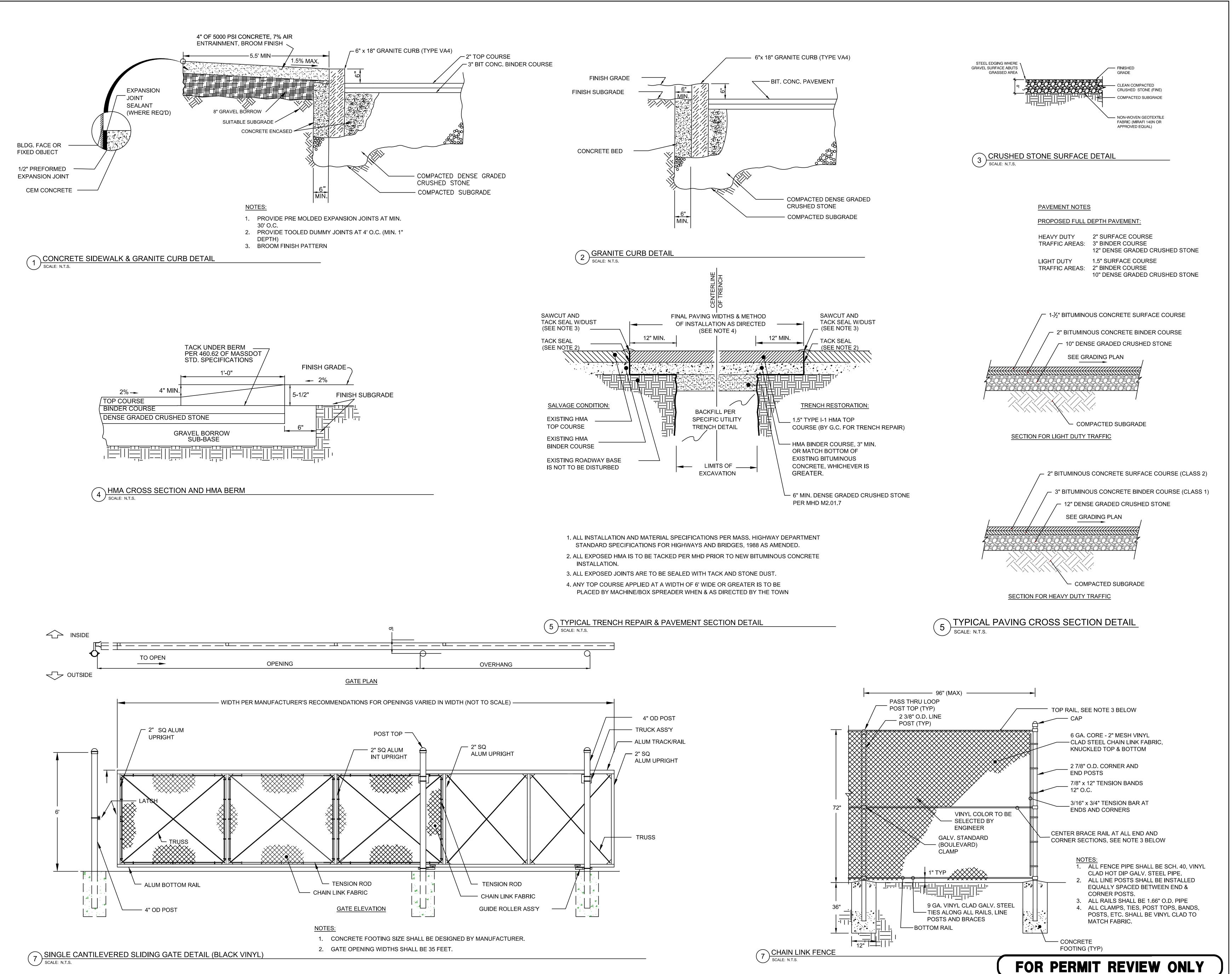
DETAILS

Sheet Number:

C803

WESTON & SAMPSON COPYRIGHT 2019

648 of 842



649 of 842

PUBLIC WORKS FACILTIY RENOVATIONS & ADDITION
51 GROVE STREET

Weston Sampsor

Weston & Sampson Engineers, Inc.

100 Foxborough Boulevard Suite 250
Foxborough, MA 02035
(508) 698-3034 (800) SAMPSON
www.westonandsampson.com

ARLINGTON, MA 02476

Consultants:

Seal:

LAURENCE F.

KEEGAN, JR.

CIVIL

NO: 3370B

REGISTERS

SSIONAL

SOLUTION

SOLUTION

REGISTERS

SSIONAL

SOLUTION

SOLUT

Rev Date Description

Revisions:

Issued For: PERMITTING

scale: AS NOTED

ite: OCTOBER 21, 2020

Drawn By: EC

Reviewed By: LFK

Approved By: LFK

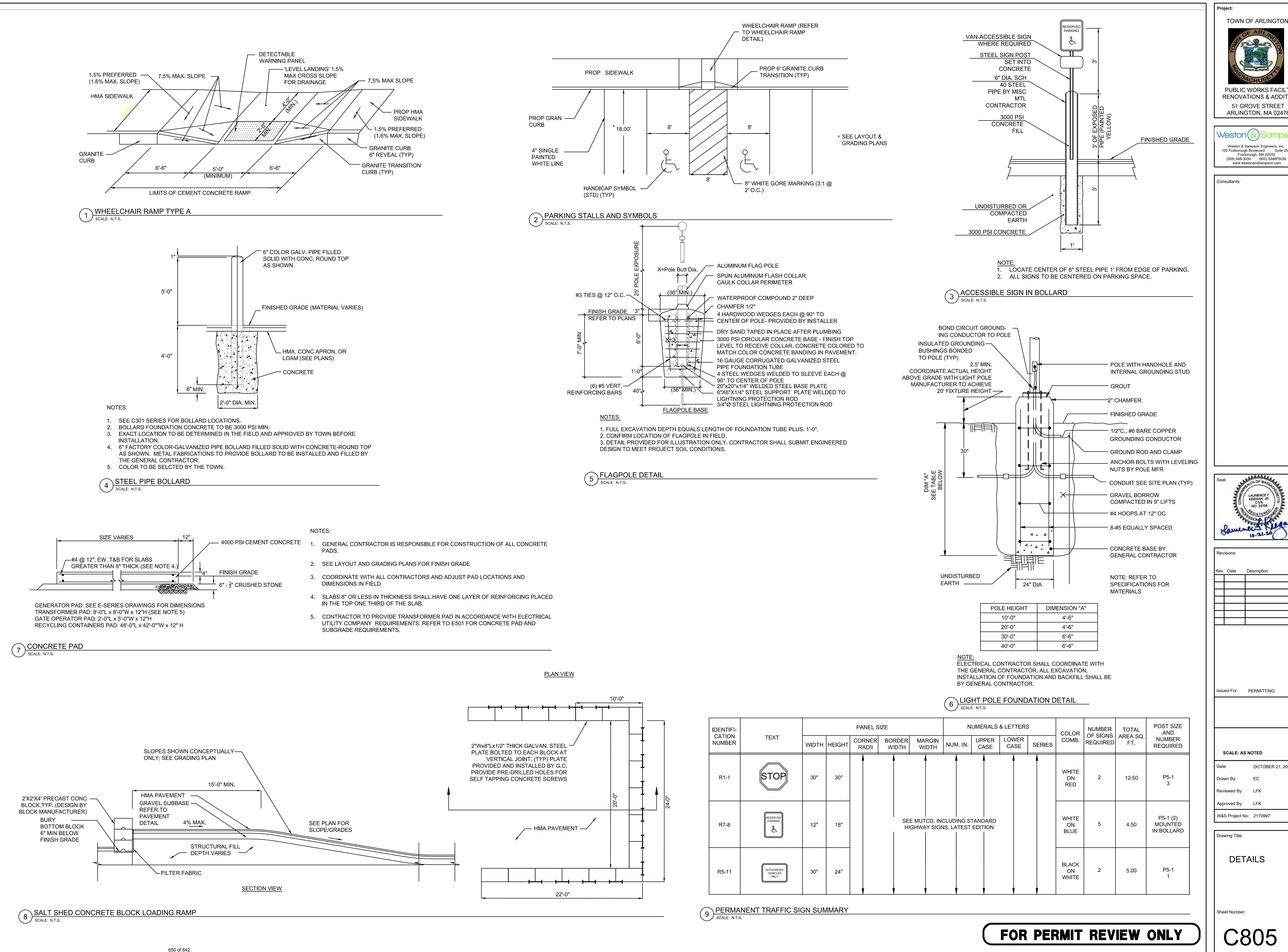
Drawing Title:

W&S Project No: 2170997

DETAILS

Sheet Number:

C804



TOWN OF ARLINGTON **PUBLIC WORKS FACILTIY RENOVATIONS & ADDITION**

51 GROVE STREET ARLINGTON, MA 02476 Weston & Sampson Weston & Sampson Engineers, Inc. 100 Foxborough Boulevard Suite 250 Foxborough, MA 02035

www.westonandsampson.com

Consultants:

Rev Date Description

Issued For: PERMITTING

SCALE: AS NOTED

OCTOBER 21, 2020 Drawn By:

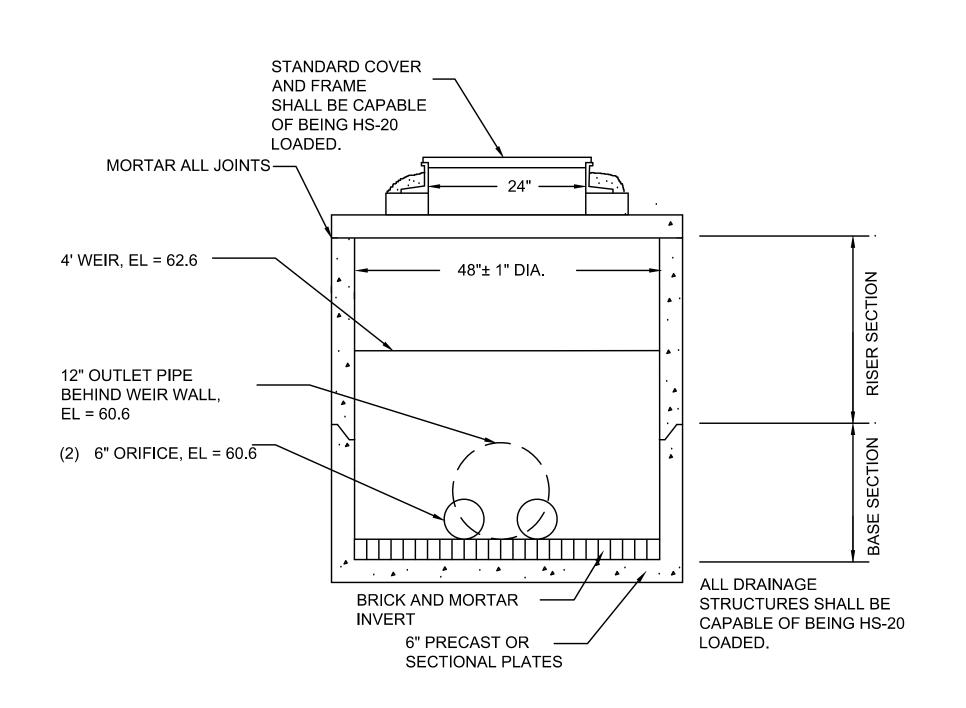
Reviewed By: LFK Approved By: LFK W&S Project No: 2170997

DETAILS

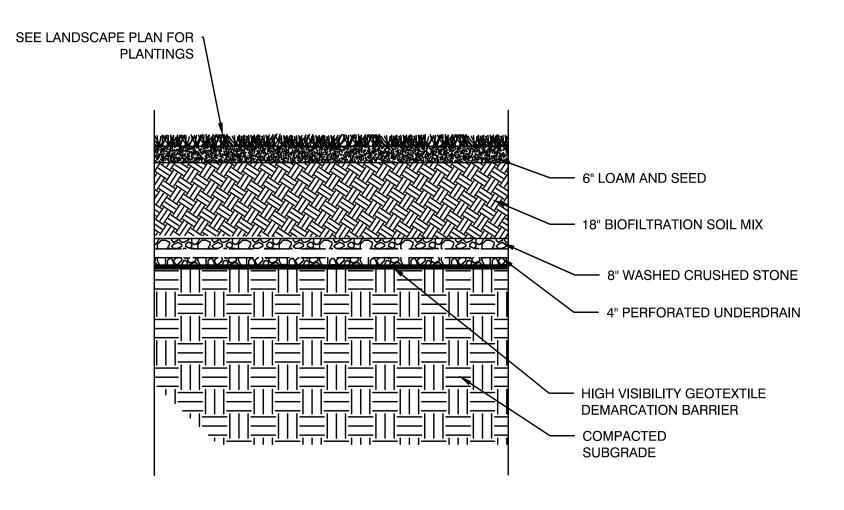
Sheet Number:

C805

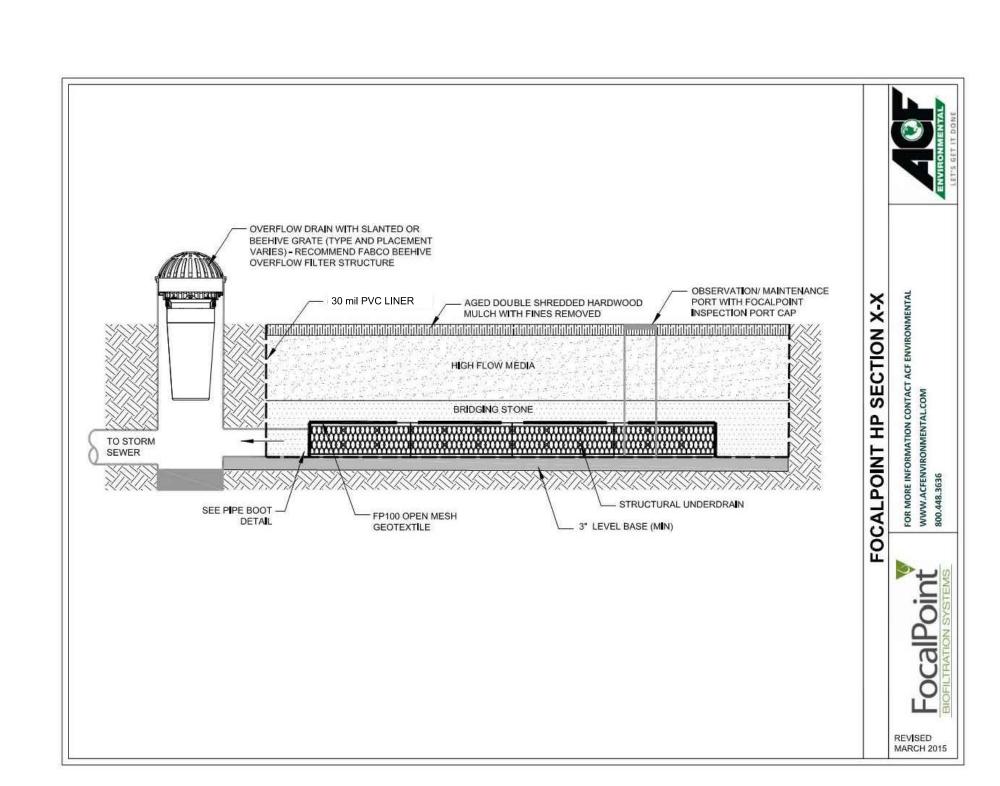
WESTON & SAMPSON COPYRIGHT 2019



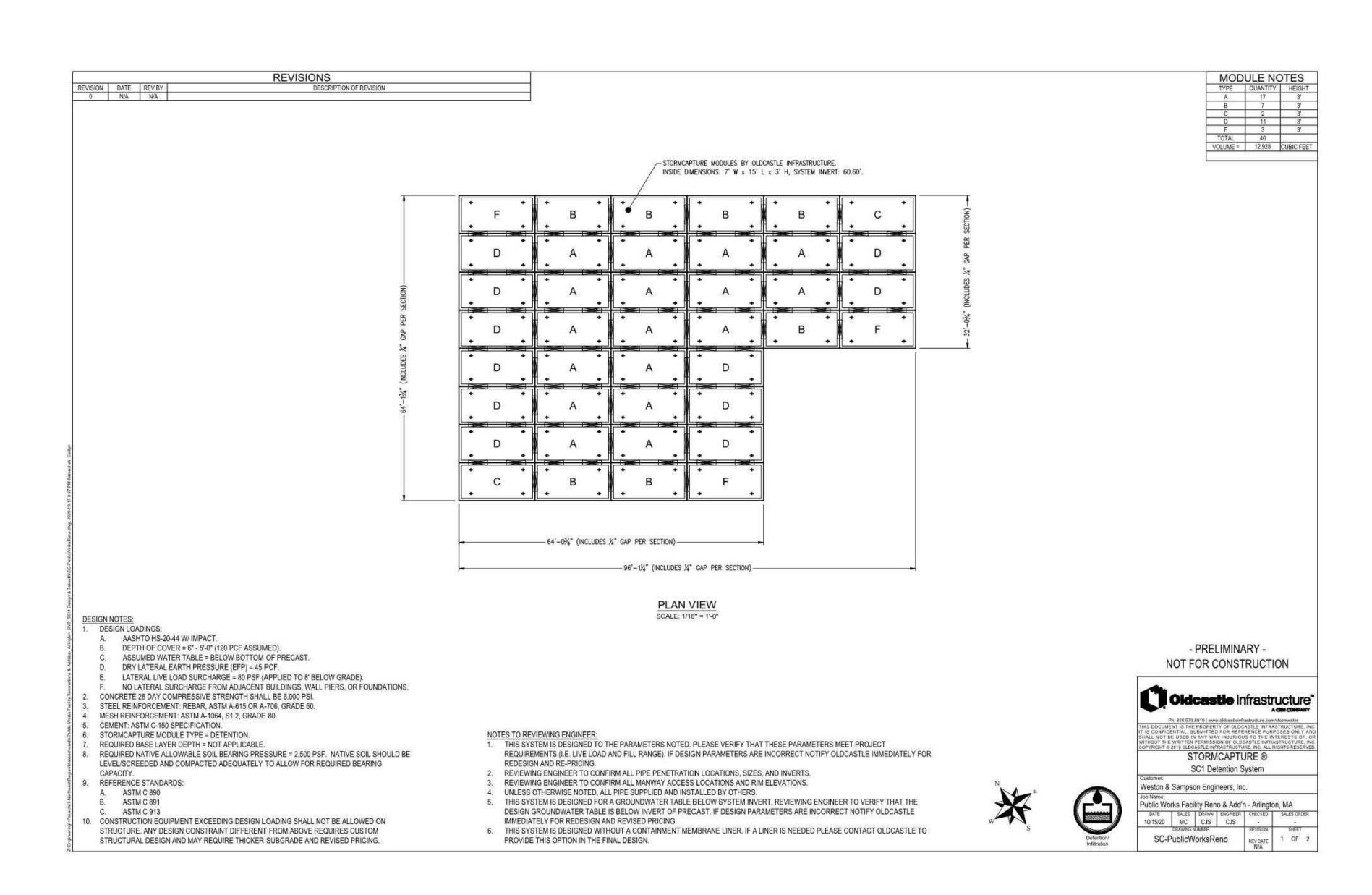
OUTLET CONTROL STRUCTURE (OCS)
SCALE: N.T.S.

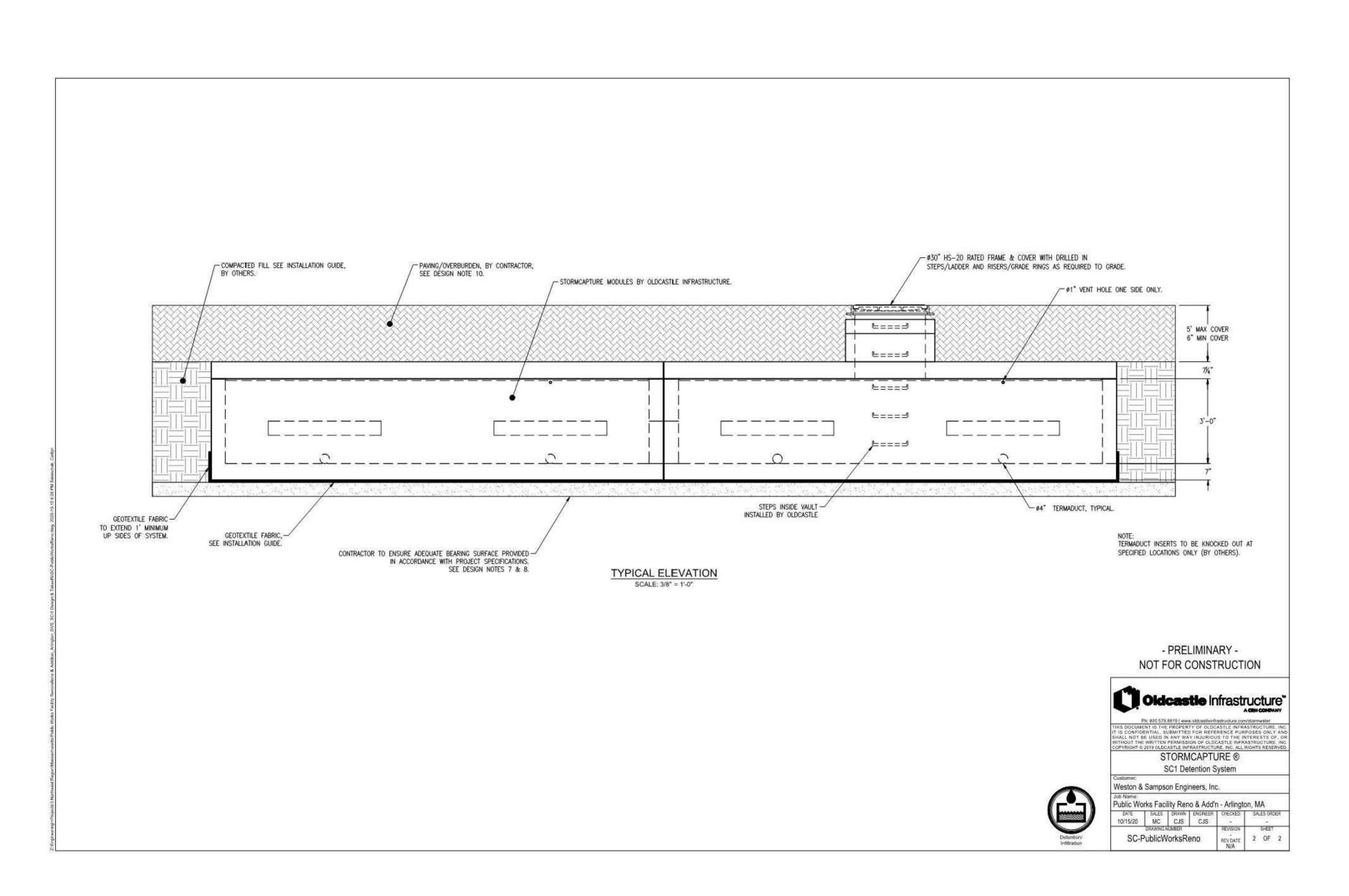


BIOFILTRATION LANDSCAPE AREA DETAIL
SCALE: N.T.S.



3 FOCAL POINT BIOFILTRATION SYSTEM SCALE: N.T.S.





4 UNDERGROUND DETENTION SYSTEM SCALE: N.T.S.

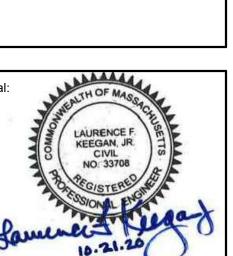
FOR PERMIT REVIEW ONLY

PUBLIC WORKS FACILTIY RENOVATIONS & ADDITION

51 GROVE STREET ARLINGTON, MA 02476

Weston & Sampson Engineers, Inc.
100 Foxborough Boulevard Suite 250
Foxborough, MA 02035
(508) 698-3034 (800) SAMPSON
www.westonandsampson.com

Consultants:



2	Same	PEGISTERS TO STORY TO
Rev	isions:	
Rev	Date	Description

sued For:	PERMITTING

ALE: AC NOTED	

SCALE: AS NOTED							
)ate:	OCTOBER 21, 2020						
Orawn By:	EC						
Reviewed By:	LFK						

Reviewed By:	LFK	
Approved By:	LFK	

Approved By: LFK

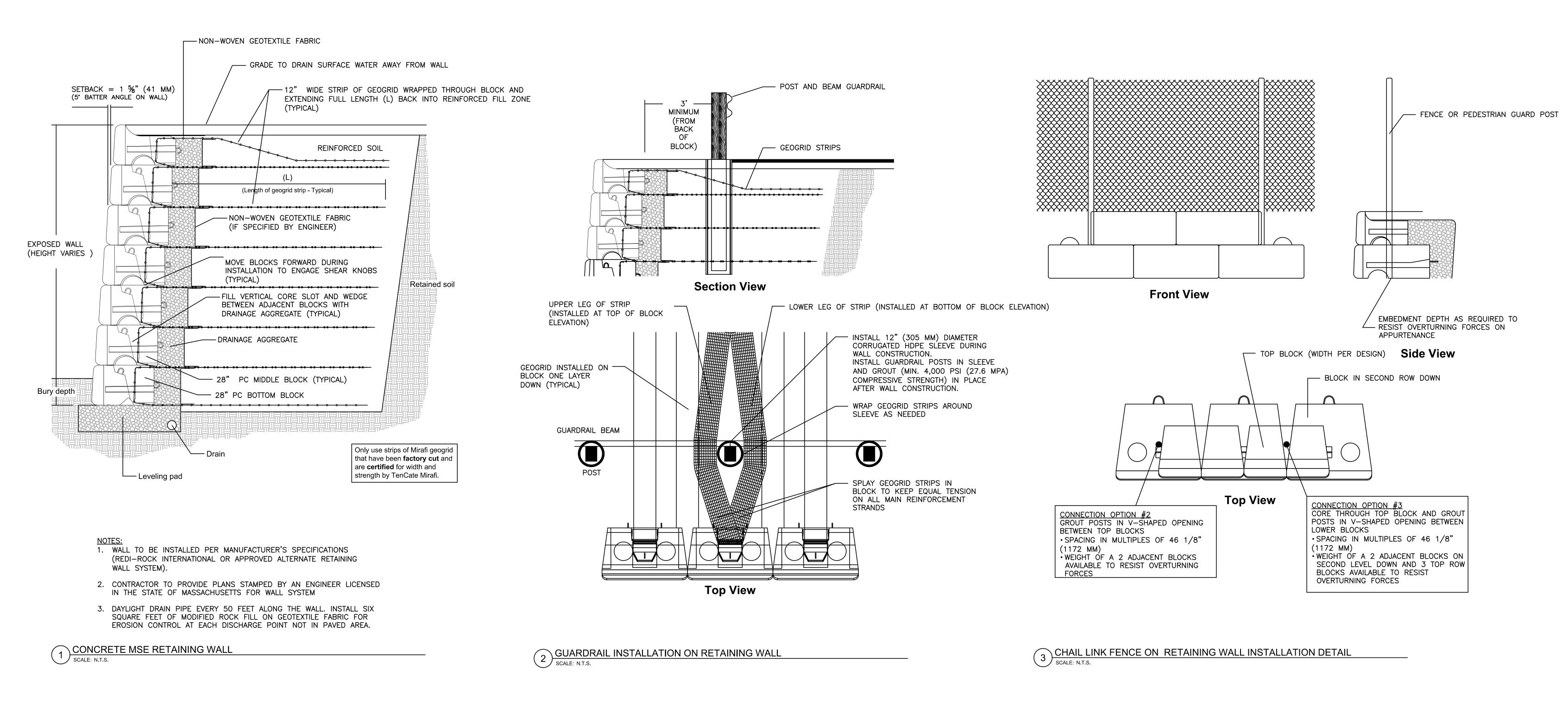
W&S Project No: 2170997

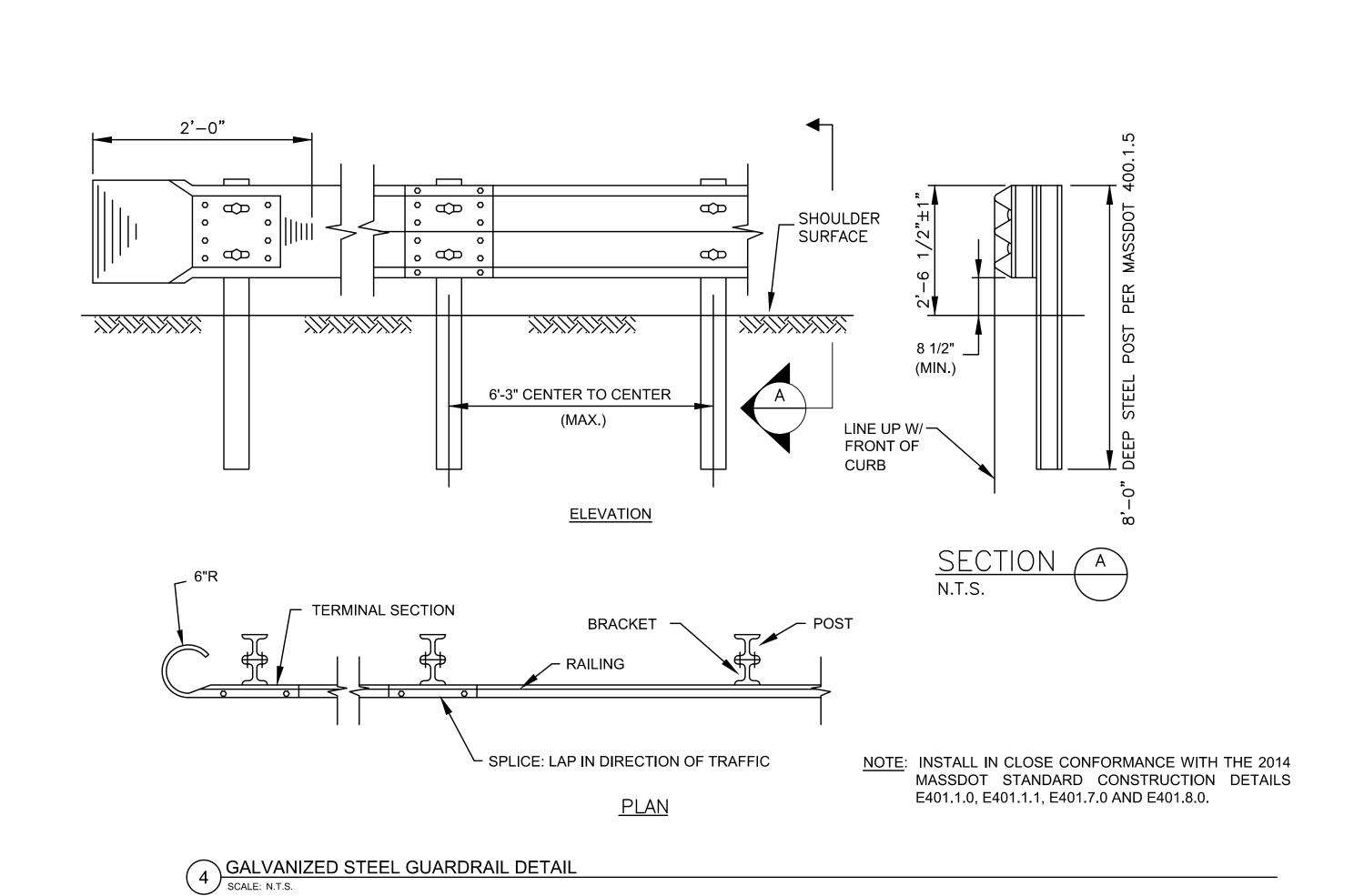
Drawing Title:

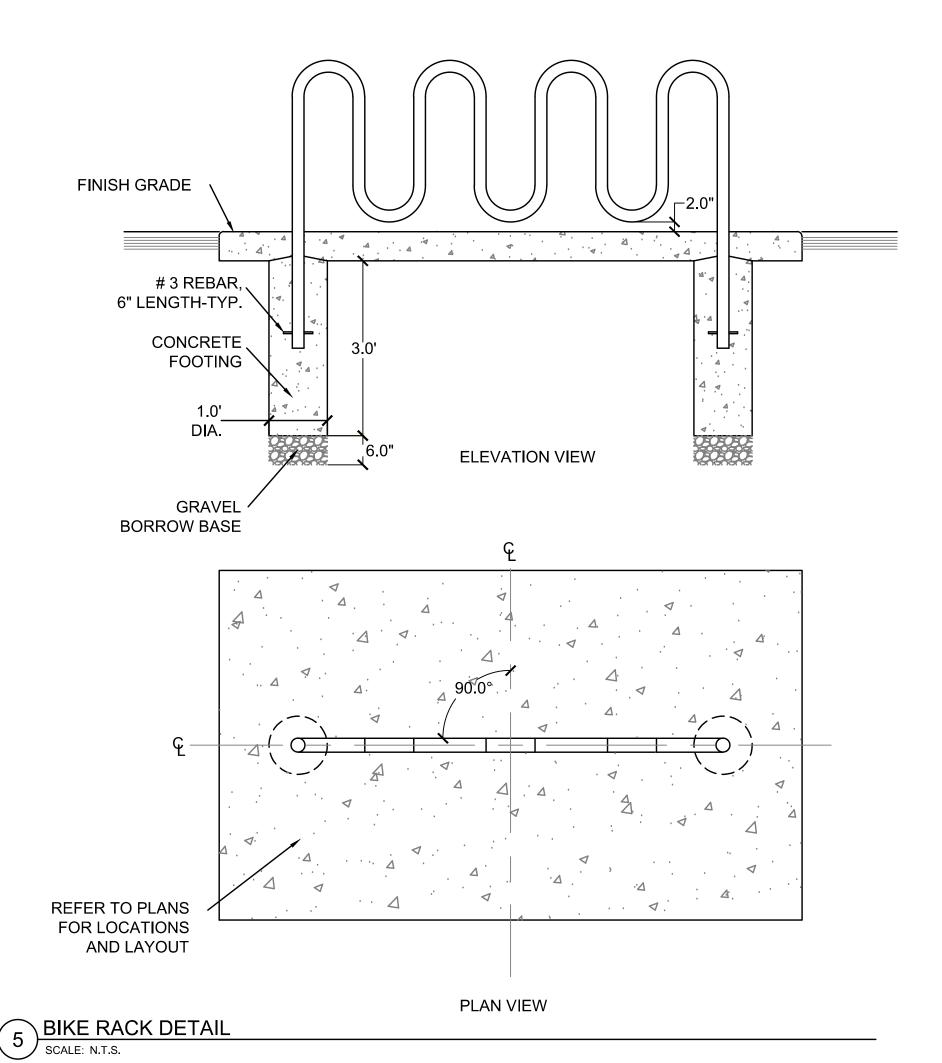
DETAILS

Sheet Number:

C806







SCALE: AS NOTED

Date: OCTOBER 21, 2020

Drawn By: EC

Reviewed By: LFK

Approved By: LFK

W&S Project No: 2170997

Drawing Title:

DETAILS

FOR PERMIT REVIEW ONLY

PUBLIC WORKS FACILTIY
RENOVATIONS & ADDITION
51 GROVE STREET
ARLINGTON, MA 02476

Weston Sampson Engineers, Inc.

100 Foxborough Boulevard Suite 250
Foxborough, MA 02035
(508) 698-3034 (800) SAMPSON
www.westonandsampson.com

Consultants:

Seal:

LAURENCE F
KEEGAN, JR.
CIVIL
NO: 33708

REGISTERED
10.21.20

Rev Date Description

Issued For: PERMITTING

Sheet Number:

LEGEND: PLANT_SCHEDULE HMA PAVEMENT CODE BOTANICAL NAME QTY DETAIL REMARKS COMMON NAME Armstrong Red Maple Acer rubrum `Armstrong` River Birch Multi-Trunk Betula nigra CRUSHED STONE **₹** •• **>** Vernal Witch hazel Hammamelis virginiana 100 YEAR FLOOD LINE PER FEMA Fraxinus pennsylvanica REGULATORY FLOODWAY PER FEMA QTY DETAIL REMARKS CODE BOTANICAL NAME COMMON NAME New Jersey Tea Ceanothus americanus Clethra alnifolia Summersweet Clethra llex glabra Inkberry Holly llex verticillata Winterberry Lindera benzoin \odot Viburnum dentatum Arrow-wood Viburnum GROUND COVERS | CODE | BOTANICAL NAME COMMON NAME SIZE SPACING QTY DETAIL REMARKS Switch Grass 12" o.c. Panicum virgatum ___(2) AA ____ _I (200) PV —— (120) PV —— A CONTRACTOR ____

CONCEPT_PLANT_SCHEDULE

RAIN GARDEN Achillea millefolium / Common Yarrow Bouteloua curtipendula / Side Oats Grama Coreopsis lanceolata / Lanceleaf Tickseed Lupinus perennis / Wild Lupine Schizachyrium scoparium / Little Bluestem Grass

TOWN OF ARLINGTON **PUBLIC WORKS FACILTIY RENOVATIONS & ADDITION**

> Weston & Sampson Engineers, Inc. 100 Foxborough Boulevard Suite 250 Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON www.westonandsampson.com

51 GROVE STREET ARLINGTON, MA 02476

Consultants:

Rev Date Description

SCALE: AS NOTED OCTOBER 21, 2020 Drawn By:

Reviewed By: LFK Approved By: LFK

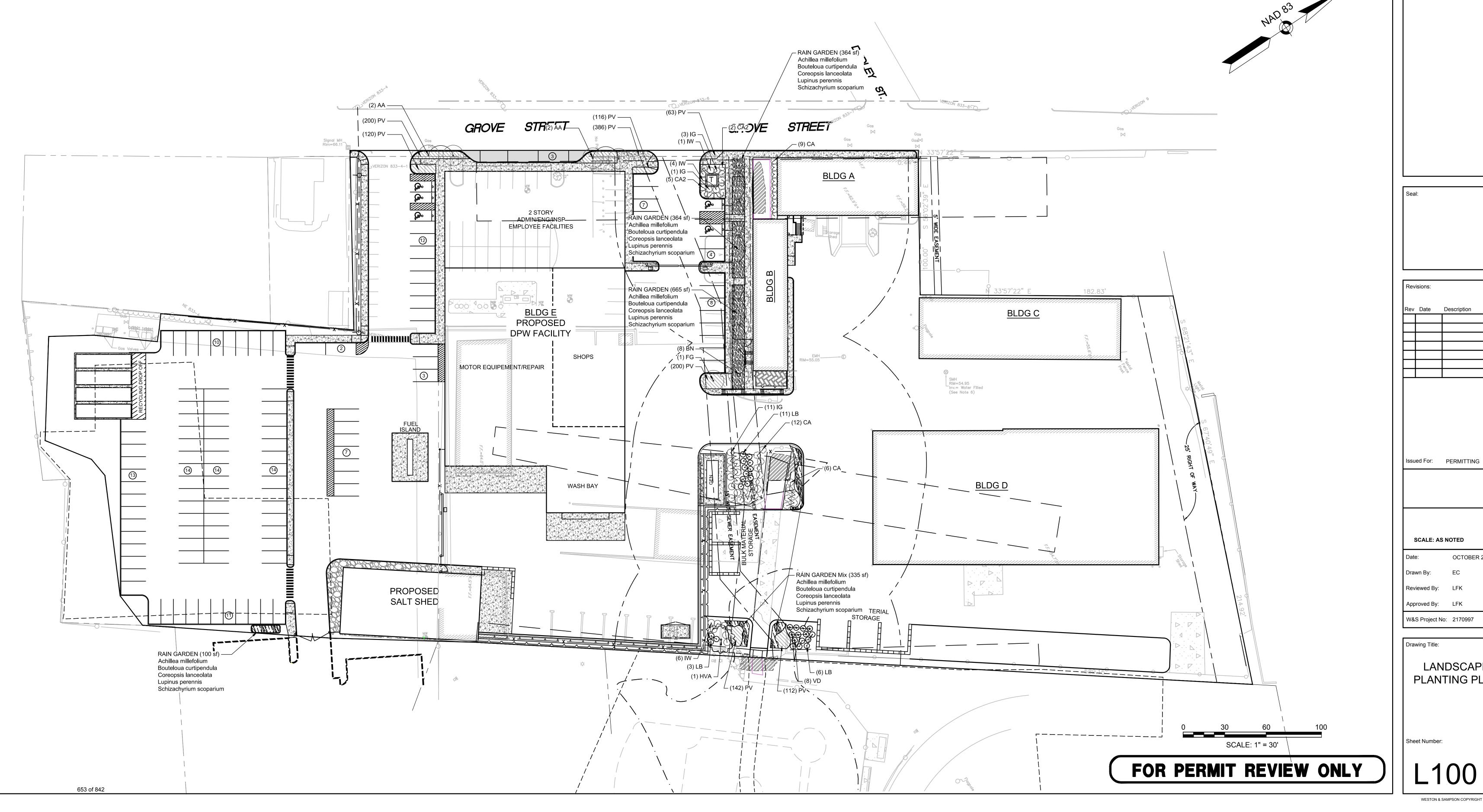
W&S Project No: 2170997

Drawing Title:

LANDSCAPE PLANTING PLAN

Sheet Number:

WESTON & SAMPSON COPYRIGHT 2019





55 Walkers Brook Drive, Suite 100, Reading, MA 01867 Tel: 978.532.1900

Arlington Conservation Commission 730 Mass Ave Annex Arlington, MA 02476

Re: Supplemental Information
NOI Filing
DPW Facility
51 Grove Street

Dear Members of the Commission:

Regarding the Notice of Intent (NOI) submitted for the Arlington DPW Facility, below please find supplemental information provided based on the discussion during the November 5, 2020 Conservation Commission Hearing. There were a few items that Commission requested clarification of or revision. Each of those items are presented below along with our response.

1. The Commission requested to swap the proposed SWTU-4 on the lower site and the new DMH.

Response:

The Grading and Drainage Plan (sheet C-603) has been revised as requested. A new catch basin is proposed in place of previously shown SWTU-4, and water quality unit was instead moved downstream of catch basin.

2. The Commission requested adding a proprietary water quality unit on the stormwater network that runs on the eastern side of building D.

Response:

The Grading and Drainage Plan (Sheet 603) has been revised as requested. A new water quality unit (SWTU-5) has been added on the downstream of the existing drainage network, prior to discharging into Mill Brook.

3. The Commission asked to consider adding a canopy over bulk material storage areas.

Response:

Adding a canopy over bulk storage areas would impede vehicle access when loading/unloading bulk storage bins, as a result it is not operationally feasible to provide this covered storage.

4. The Commission asked to consider re-grading bulk storage areas so that runoff from that area will not enter the stormwater system.

Response:

Re-grading of material storage areas was not feasible without impacting the 100-year flood area around Mill Brook culvert openings. Alternatively, adding an additional water quality treatment unit on the stormwater system branch east of Building D, will ensure that any runoff from material storage area will be treated prior to discharging into Mill Brook.

5. The Commission requested to look at a more resilient alternative to the proposed Ash trees or provide a management plan to ensure they are long lived.

Response:

One Ash tree previously proposed on site is replaced with a Hackberry tree (Celtis Occidentalis), as a more resilient alternative.

6. The Commission asked to update stormwater calculations with NOAA Atlas 14 Plus and NOAA Atlas 14 Plus Plus rainfall depths.

Response:

HydroCAD model has been updated with NOAA Atlas 14 Plus Plus rainfall depths. Revised comparison table and HydroCAD analysis is provided with this submission. An analysis using NOAA Atlas 12 Plus rainfall depths has also been completed, and rainfall comparison table is provided as well. The HydroCAD analysis will be provided to the Commission upon request.

The following rainfall depths were used for NOAA Plus and NOAA Plus Plus rainfall:

	NOAA Plus Rainfall (in)	NOAA Plus Plus Rainfall (in)
2 – Year Storm	3.63	4.04
10 – Year Storm	5.79	6.43
25 – Year Storm	7.49	8.32
50 – Year Storm	8.72	9.69
100 – Year Storm	10.45	11.5

7. The Commission asked to update Environmental Protection specifications language to ensure no untreated discharge enters the stream during construction

Response:

Environmental Protection specification has been updated as requested. Revised copy is provided.

8. Break out impervious surface calculations into 200 ft Riverfront Area and 100 ft Wetland Buffer Area.

Response:

A table with breakdown of the imperious surface within 200 ft Riverfront Area and 100 ft Wetland Buffer Area has been added to revised Layout and Materials Plan, sheet C401. This includes a modification of the earthen berm area to provide a future canopy structure for covered storage of equipment.

9. The Commission asked to consider changing the 80% TSS reduction area to 90% TSS reduction in new impervious.

Response:

The 80% TSS achieved in the new impervious area was the maximum TSS removal rate that could be achieved without relying on infiltration to provide additional TSS removal. Further reduction to 90% is not feasible because infiltration is not allowed due to historic contamination on site.

10. The Commission asked to consider additional opportunities for educational signage.

Response:

Applicant agrees. Educational signage will be developed and displayed in the areas of proposed rain gardens showcasing LID measures implemented on site.

11. Strengthen statements of vegetation survivability, replacements, and maintenance, consider longer maintenance period.

Response:

The typical warranty period for new plantings is one year. Project specifications have been revised to increase this warranty period to two years. After the warranty period, the DPW will be responsible for evaluating the health of the landscape areas each planting season, in the spring and the fall. Any unhealthy plantings identified by the DPW will be evaluated and replaced if necessary.

12. Include Invasive Management Plan

Response:

Invasive species specification is attached.

13. Consider increasing the proposed 44% TSS reduction in existing impervious area.

Response:



Various BMPs were considered to provide water quality treatment in the existing impervious area, however due to the physical and environmental constraints of the site, only 47% reduction was achievable.

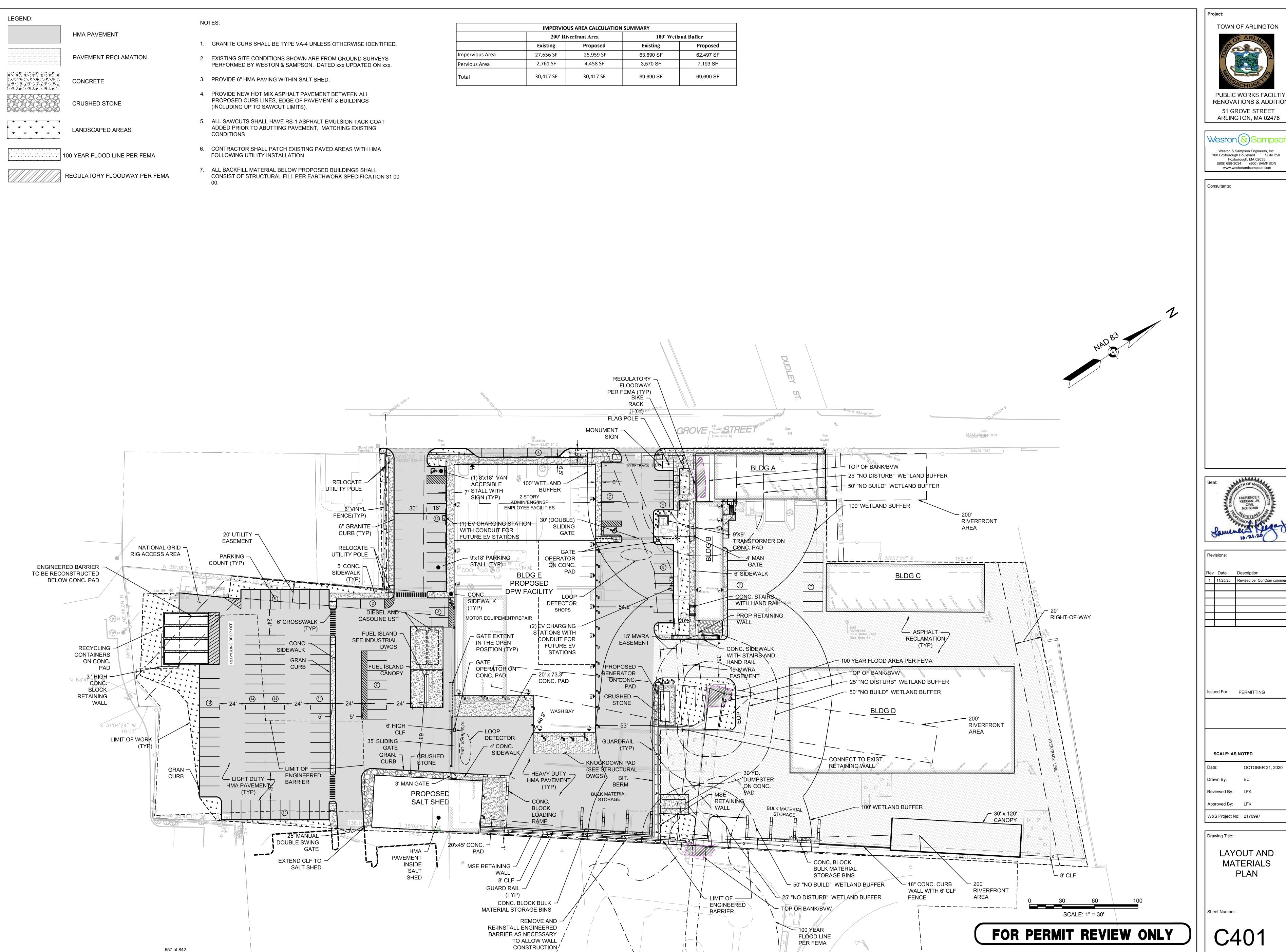
Sincerely,

WESTON & SAMPSON ENGINEERS, INC.

Elena Compter, P.É Project Engineer

Attachments:

Plans – Sheet C401, Layout and Materials Plan Sheet C603, Grading and Drainage Plan East Pre vs Post Flows Spreadsheet – NOAA+ rainfall Pre vs Post Flows Spreadsheet – NOAA++ rainfall Existing HydroCAD analysis – NOAA++ rainfall Proposed HydroCAD analysis – NOAA++ rainfall Specification 01570 – Environmental Protection Specification 31 12 00.13 – Invasive Species



TOWN OF ARLINGTON

PUBLIC WORKS FACILTIY **RENOVATIONS & ADDITION** 51 GROVE STREET ARLINGTON, MA 02476

Weston & Sampson Engineers, Inc. 100 Foxborough Boulevard Suite 250

Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON

www.westonandsampson.com Consultants:

Issued For: PERMITTING

SCALE: AS NOTED

OCTOBER 21, 2020 Drawn By: Reviewed By: LFK

Approved By: LFK

W&S Project No: 2170997

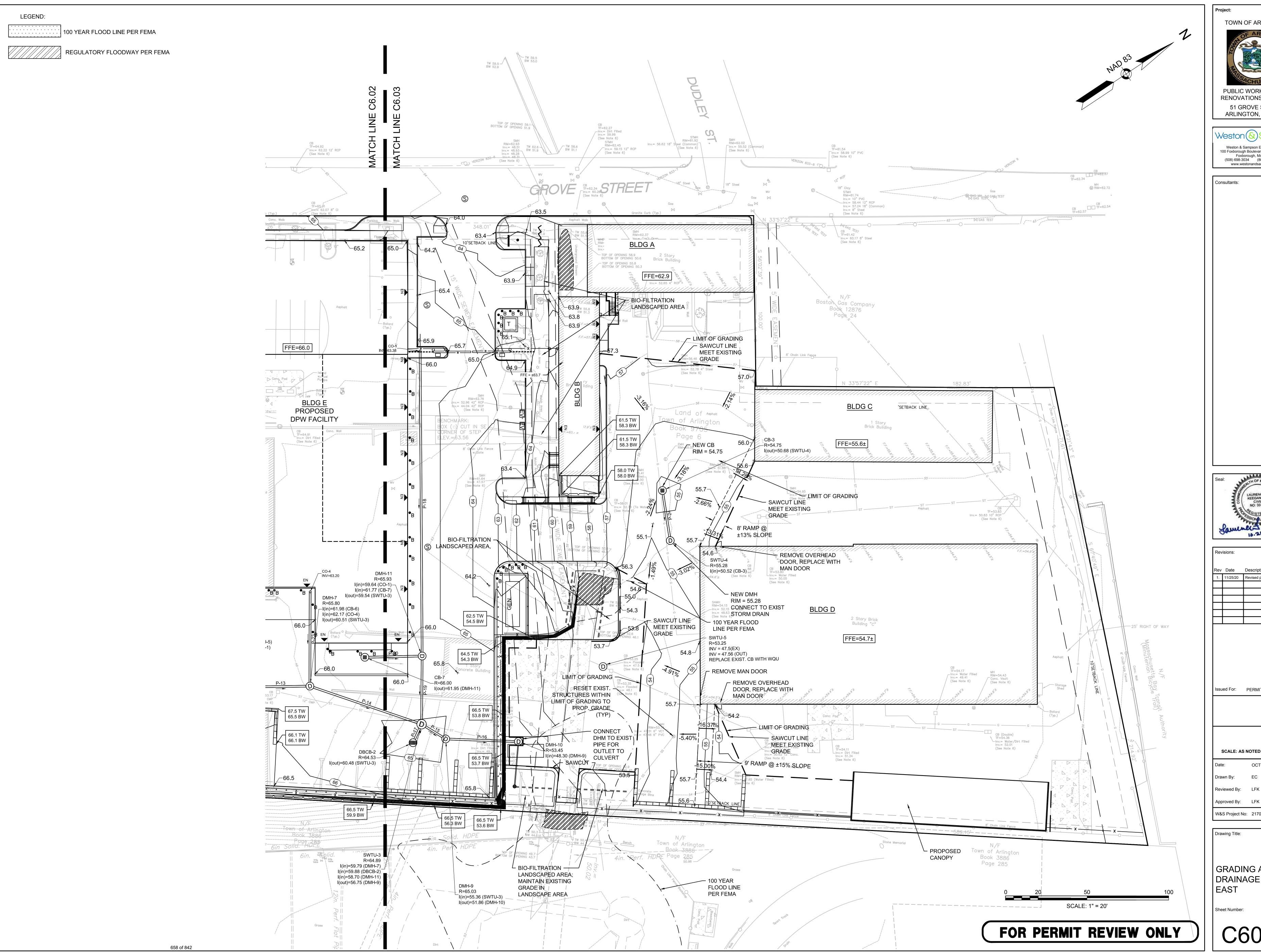
Drawing Title:

LAYOUT AND **MATERIALS** PLAN

Sheet Number:

C401

WESTON & SAMPSON COPYRIGHT 2019



TOWN OF ARLINGTON



PUBLIC WORKS FACILTIY RENOVATIONS & ADDITION 51 GROVE STREET ARLINGTON, MA 02476

Weston & Sampson Engineers, Inc.

100 Foxborough Boulevard Suite 250
Foxborough, MA 02035 (508) 698-3034 (800) SAMPSON www.westonandsampson.com

Consultants:

Rev	Revisions:							
D	Data	Description						
Rev	Date	Description						
1.	11/25/20	Revised per ConCom comments						

Issued For: PERMITTING

SCALE: AS NOTED

OCTOBER 21, 2020 Drawn By: Reviewed By: LFK

W&S Project No: 2170997

GRADING AND DRAINAGE PLAN -

Sheet Number:

C603

WESTON & SAMPSON COPYRIGHT 2019

ARLINGTON DPW FACILITY ARLINGTON, MA REVISED - 11/24/2020 CALCULATIONS HAVE BEEN UPDATED TO NOAA+ RAINFALL DEPTHS

			Pre-De	/elopment C	. Post-Developme	ent Conditio	ns				
		Pre-Developme	ent Flows			Post-Development Flows					
	2-year storm	10-year storm	25-year storm	50-year storm	100-year storm		2-year storm	10-year storm	25-year storm	50-year storm	100-year storm
Output	3.63 in	5.79 in	7.49 in	8.7 in	10.4 in	Output	3.63 in	5.79 in	7.49 in	8.7 in	10.4 in
Subcatchment/Reach	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)	Subcatchment/Reach	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)
POI 1 Mill Brook	12.93	20.90	27.13	31.56	37.78	POI 1 Mill Brook	12.46	20.52	26.80	31.25	37.49
POI 2	0.99	1.69	2.23	2.63	3.16	POI 2	0.93	1.64	2.18	2.57	3.11
Grove Street						Grove Street					
POI 3 Arlington High School	3	6.22	8.84	10.71	13.34	POI 3 Arlington High School	1.99	3.12	4.93	5.70	12.07

ARLINGTON DPW FACILITY ARLINGTON, MA REVISED - 11/24/2020 CALCULATIONS HAVE BEEN UPDATED TO NOAA++ RAINFALL DEPTHS

	Pre-Development Conditions vs. Post-Development Conditions										
		Pre-Developme	ent Flows			Post-Development Flows					
	2-year storm	10-year storm	25-year storm	50-year storm	100-year storm		2-year storm	10-year storm	25-year storm	50-year storm	100-year storm
Output	4.4 in	6.43 in	8.32 in	9.69 in	11.5 in	Output	4.4 in	6.43 in	8.32 in	9.69 in	11.5 in
Subcatchment/Reach	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)	Subcatchment/Reach	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)	Inflow (cfs)
POI 1 Mill Brook	14.45	23.25	30.17	35.19	41.8	POI 1 Mill Brook	14.00	22.89	29.86	34.89	41.52
POI 2 Grove Street	1.12	1.90	2.5	2.93	3.5	POI 2 Grove Street	1.07	1.84	2.45	2.89	3.46
POI 3 Arlington High School	3.59	7.20	10.12	12.24	15.04	POI 3 Arlington High School	2.21	3.82	5.53	9.38	17.81

Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Printed 11/25/2020

Page 1

Area Listing (all nodes)

Area	CN	Description
(sq-ft)		(subcatchment-numbers)
2,792	49	50-75% Grass cover, Fair, HSG A (DA-1)
26,541	39	>75% Grass cover, Good, HSG A (DA-2, DA-3)
232,106	98	Paved parking, HSG A (DA-1, DA-2, DA-3)
261,439	91	TOTAL AREA

Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Printed 11/25/2020

Page 2

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
261,439	HSG A	DA-1, DA-2, DA-3
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
261,439		TOTAL AREA

Printed 11/25/2020

Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 3

Νι

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
 2,792	0	0	0	0	2,792	50-75% Grass
						cover, Fair
26,541	0	0	0	0	26,541	>75% Grass
						cover, Good
232,106	0	0	0	0	232,106	Paved parking
261 439	0	0	0	0	261 439	TOTAL AREA

Existing Conditions - NOAA ++ Rainfall Type III 24-hr 2-Year Rainfall=3.23"

Prepared by Weston & Sampson

Printed 11/25/2020

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 4

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: DA-2 Runoff Area=165,210 sf 98.31% Impervious Runoff Depth>2.75"

Tc=6.0 min CN=97 Runoff=11.44 cfs 37,803 cf

SubcatchmentDA-2: DA-2 Runoff Area=14,062 sf 89.87% Impervious Runoff Depth>2.24"

Tc=6.0 min CN=92 Runoff=0.86 cfs 2,630 cf

SubcatchmentDA-3: DA-3 Runoff Area=82,167 sf 69.43% Impervious Runoff Depth>1.31"

Flow Length=337' Tc=13.3 min CN=80 Runoff=2.44 cfs 8,990 cf

Link POA-1: Mill Brook Inflow=11.44 cfs 37,803 cf

Primary=11.44 cfs 37,803 cf

Link POA-2: Grove Street Inflow=0.86 cfs 2,630 cf

Primary=0.86 cfs 2,630 cf

Link POA-3: Arlington High School Inflow=2.44 cfs 8,990 cf

Primary=2.44 cfs 8,990 cf

Total Runoff Area = 261,439 sf Runoff Volume = 49,423 cf Average Runoff Depth = 2.27" 11.22% Pervious = 29,333 sf 88.78% Impervious = 232,106 sf

Page 5

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

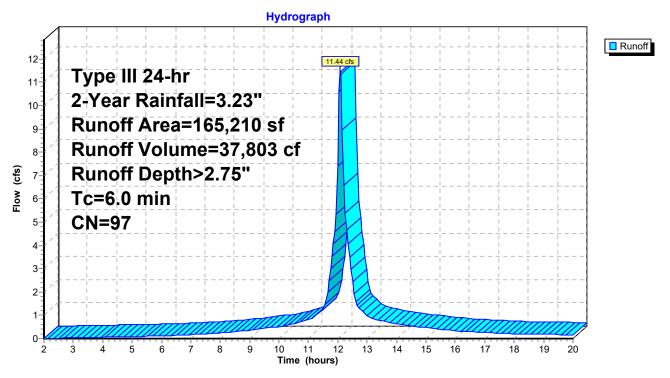
Summary for Subcatchment DA-1: DA-2

Runoff = 11.44 cfs @ 12.09 hrs, Volume= 37,803 cf, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.23"

A	rea (sf)	CN	Description						
	2,792	49	50-75% Gra	Fair, HSG A					
	162,418	98	Paved park	Paved parking, HSG A					
•	165,210	97	Weighted A	verage					
2,792 1.69% Pervious Area									
•	162,418		98.31% lmp	pervious Ar	rea				
Тс	9	Slope	,	Capacity	Description				
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
6.0					Direct Entry.				

Subcatchment DA-1: DA-2



Runoff

(cfs) 0.51

0.47

0.44

0.40

0.37

0.33 0.31 0.29

0.28

0.26 0.25

0.23

0.22

0.20

0.19

0.19

0.18

0.18

0.17

0.17 0.17

0.16

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 6

Hydrograph for Subcatchment DA-1: DA-2

			, ,	-		
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)
2.00	0.06	0.00	0.00	14.75	2.73	2.39
2.25	0.07	0.00	0.01	15.00	2.76	2.42
2.50	0.08	0.00	0.01	15.25	2.79	2.45
2.75	0.09	0.00	0.02	15.50	2.82	2.48
3.00	0.10	0.00	0.03	15.75	2.84	2.50
3.25	0.11	0.01	0.03	16.00	2.86	2.52
3.50	0.12	0.01	0.04	16.25	2.88	2.54
3.75 4.00	0.13 0.14	0.01 0.02	0.05 0.05	16.50 16.75	2.90 2.92	2.56 2.58
4.00	0.14	0.02	0.06	17.00	2.92	2.60
4.50	0.16	0.02	0.07	17.25	2.95	2.61
4.75	0.17	0.03	0.08	17.50	2.97	2.63
5.00	0.18	0.03	0.08	17.75	2.98	2.64
5.25	0.20	0.04	0.09	18.00	3.00	2.66
5.50	0.21	0.05	0.10	18.25	3.01	2.67
5.75	0.22	0.05	0.11	18.50	3.02	2.68
6.00	0.23	0.06	0.11	18.75	3.03	2.69
6.25	0.25	0.07	0.12	19.00	3.05	2.70
6.50 6.75	0.26 0.28	0.08 0.09	0.14 0.15	19.25 19.50	3.06 3.07	2.72 2.73
7.00	0.29	0.10	0.17	19.75	3.08	2.74
7.25	0.31	0.11	0.18	20.00	3.09	2.75
7.50	0.33	0.12	0.20			
7.75	0.35	0.14	0.22			
8.00	0.37	0.15	0.23			
8.25	0.39	0.17	0.26			
8.50	0.41	0.19	0.29			
8.75 9.00	0.44 0.47	0.21 0.23	0.33 0.36			
9.25	0.50	0.26	0.40			
9.50	0.54	0.29	0.44			
9.75	0.57	0.32	0.47			
10.00	0.61	0.35	0.51			
10.25	0.65	0.39	0.57			
10.50	0.70	0.43	0.65			
10.75	0.75	0.48	0.72			
11.00 11.25	0.81 0.88	0.53 0.59	0.80 0.99			
11.50	0.86	0.59	1.27			
11.75	1.15	0.84	3.01			
12.00	1.61	1.30	7.40			
12.25	2.08	1.75	5.38			
12.50	2.27	1.93	2.44			
12.75	2.35	2.02	1.27			
13.00	2.42	2.09 2.14	0.99			
13.25 13.50	2.48 2.53	2.14	0.84 0.77			
13.75	2.58	2.19	0.77			
14.00	2.62	2.28	0.63			
14.25	2.66	2.32	0.58			
14.50	2.69	2.36	0.54			

Page 7

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

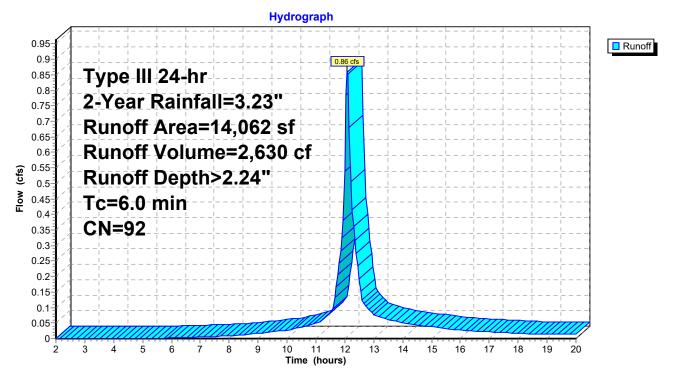
Summary for Subcatchment DA-2: DA-2

Runoff = 0.86 cfs @ 12.09 hrs, Volume= 2,630 cf, Depth> 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.23"

	Area (sf)	CN	Description				
	1,425	39	Good, HSG A	_			
	12,637	98	Paved parking, HSG A				
	14,062	92	Weighted A	verage			
1,425 10.13% Pervious Area					a		
	12,637 89.87% Impervious Are				ırea		
_		01			B		
To	5	Slope	,	Capacity	·		
(min)) (feet)	(ft/ft	(ft/sec)	(cfs)			
6.0)				Direct Entry.		

Subcatchment DA-2: DA-2



Runoff (cfs) 0.04 0.04 0.04 0.03 0.03 0.03 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.01 0.01 0.01 0.01 0.01 0.01

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 8

Hydrograph for Subcatchment DA-2: DA-2

			, ,	•		
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)
2.00	0.06	0.00	0.00	14.75	2.73	1.91
2.25	0.07	0.00	0.00	15.00	2.76	1.93
2.50	0.08	0.00	0.00	15.25	2.79	1.96
2.75	0.09	0.00	0.00	15.50	2.82	1.99
3.00	0.10	0.00	0.00	15.75	2.84	2.01
3.25	0.11	0.00	0.00	16.00	2.86	2.03
3.50	0.12	0.00	0.00	16.25	2.88	2.05
3.75 4.00	0.13 0.14	0.00	0.00 0.00	16.50 16.75	2.90 2.92	2.07 2.09
4.00	0.14	0.00	0.00	17.00	2.92	2.10
4.50	0.16	0.00	0.00	17.25	2.95	2.12
4.75	0.17	0.00	0.00	17.50	2.97	2.13
5.00	0.18	0.00	0.00	17.75	2.98	2.15
5.25	0.20	0.00	0.00	18.00	3.00	2.16
5.50	0.21	0.00	0.00	18.25	3.01	2.17
5.75	0.22	0.00	0.00	18.50	3.02	2.18
6.00	0.23	0.00	0.00	18.75	3.03	2.19
6.25 6.50	0.25 0.26	0.01 0.01	0.00 0.00	19.00 19.25	3.05 3.06	2.21 2.22
6.75	0.28	0.01	0.00	19.23	3.07	2.23
7.00	0.29	0.01	0.00	19.75	3.08	2.24
7.25	0.31	0.02	0.01	20.00	3.09	2.25
7.50	0.33	0.02	0.01			
7.75	0.35	0.03	0.01			
8.00	0.37	0.04	0.01			
8.25	0.39	0.04	0.01			
8.50 8.75	0.41 0.44	0.05 0.06	0.01 0.01			
9.00	0.44	0.08	0.01			
9.25	0.50	0.09	0.02			
9.50	0.54	0.11	0.02			
9.75	0.57	0.13	0.02			
10.00	0.61	0.15	0.03			
10.25	0.65	0.17	0.03			
10.50	0.70	0.20	0.04			
10.75 11.00	0.75 0.81	0.23 0.27	0.04 0.05			
11.00	0.81	0.27	0.05			
11.50	0.96	0.31	0.08			
11.75	1.15	0.51	0.20			
12.00	1.61	0.90	0.54			
12.25	2.08	1.31	0.42			
12.50	2.27	1.48	0.19			
12.75	2.35	1.56	0.10			
13.00	2.42	1.62	0.08			
13.25 13.50	2.48 2.53	1.67 1.72	0.07 0.06			
13.75	2.58	1.72	0.06			
14.00	2.62	1.80	0.05			
14.25	2.66	1.84	0.05			
14.50	2.69	1.87	0.04			
				I		

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 9

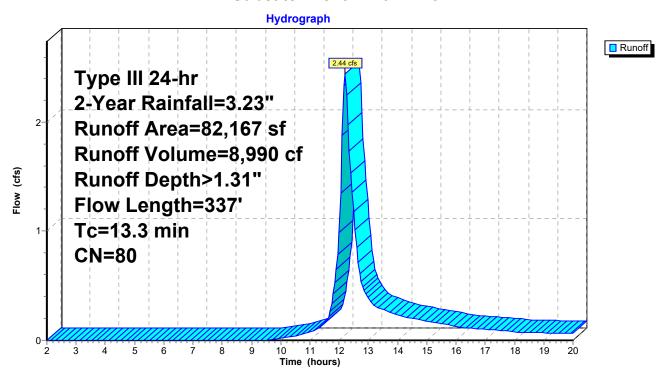
Summary for Subcatchment DA-3: DA-3

Runoff = 2.44 cfs @ 12.19 hrs, Volume= 8,990 cf, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.23"

_	Α	rea (sf)	CN [Description						
	25,116 39 >75% Grass cover, Good, HSG A									
	57,051 98 Paved parking, HSG A									
82,167 80 Weighted Average										
		25,116	3	30.57% Pe	rvious Area					
		57,051	6	59.43% Imp	pervious Ar	ea				
	_		•							
	Tc	Length	Slope	•	Capacity	Description				
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	11.1	100	0.0150	0.15		Sheet Flow,				
						Grass: Short n= 0.150 P2= 3.12"				
	1.8	112	0.0210	1.01		Shallow Concentrated Flow,				
						Short Grass Pasture Kv= 7.0 fps				
	0.4	125	0.0080	5.27	4.14	1				
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'				
_						n= 0.010 PVC, smooth interior				
	13 3	337	Total							

Subcatchment DA-3: DA-3



Runoff (cfs) 0.19 0.18 0.16 0.15 0.14 0.13 0.12 0.11 0.11 0.10 0.09 0.09 80.0 80.0 0.07 0.07 0.07 0.07 0.07 0.07 0.06 0.06

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 10

Hydrograph for Subcatchment DA-3: DA-3

			, ,	•		
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours) 2.00	(inches) 0.06	(inches) 0.00	(cfs) 0.00	(hours) 14.75	(inches) 2.73	(inches) 1.05
2.25	0.00	0.00	0.00	15.00	2.76	1.03
2.50	0.07	0.00	0.00	15.00	2.79	1.09
2.75	0.00	0.00	0.00	15.50	2.82	1.11
3.00	0.10	0.00	0.00	15.75	2.84	1.13
3.25	0.11	0.00	0.00	16.00	2.86	1.15
3.50	0.12	0.00	0.00	16.25	2.88	1.16
3.75	0.13	0.00	0.00	16.50	2.90	1.18
4.00	0.14	0.00	0.00	16.75	2.92	1.19
4.25	0.15	0.00	0.00	17.00	2.94	1.20
4.50	0.16	0.00	0.00	17.25	2.95	1.22
4.75	0.17	0.00	0.00	17.50	2.97	1.23
5.00	0.18	0.00	0.00	17.75	2.98	1.24
5.25	0.20	0.00	0.00	18.00	3.00	1.25
5.50	0.21	0.00	0.00	18.25	3.01	1.26
5.75 6.00	0.22 0.23	0.00 0.00	0.00 0.00	18.50 18.75	3.02 3.03	1.27 1.28
6.25	0.25	0.00	0.00	19.00	3.05	1.20
6.50	0.26	0.00	0.00	19.00	3.06	1.29
6.75	0.28	0.00	0.00	19.50	3.07	1.30
7.00	0.29	0.00	0.00	19.75	3.08	1.31
7.25	0.31	0.00	0.00	20.00	3.09	1.32
7.50	0.33	0.00	0.00			
7.75	0.35	0.00	0.00			
8.00	0.37	0.00	0.00			
8.25	0.39	0.00	0.00			
8.50	0.41	0.00	0.00			
8.75	0.44	0.00	0.00			
9.00	0.47	0.00	0.00			
9.25 9.50	0.50 0.54	0.00 0.00	0.00 0.00			
9.75	0.57	0.00	0.00			
10.00	0.61	0.00	0.02			
10.25	0.65	0.01	0.03			
10.50	0.70	0.01	0.04			
10.75	0.75	0.02	0.06			
11.00	0.81	0.03	0.08			
11.25	0.88	0.05	0.10			
11.50	0.96	0.07	0.16			
11.75	1.15	0.13	0.33			
12.00	1.61	0.34	0.99			
12.25 12.50	2.08 2.27	0.61	2.25 1.18			
12.75	2.27	0.73 0.79	0.54			
13.00	2.33	0.79	0.34			
13.25	2.48	0.87	0.31			
13.50	2.53	0.91	0.28			
13.75	2.58	0.94	0.26			
14.00	2.62	0.97	0.23			
14.25	2.66	1.00	0.21			
14.50	2.69	1.03	0.20			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 11

Summary for Link POA-1: Mill Brook

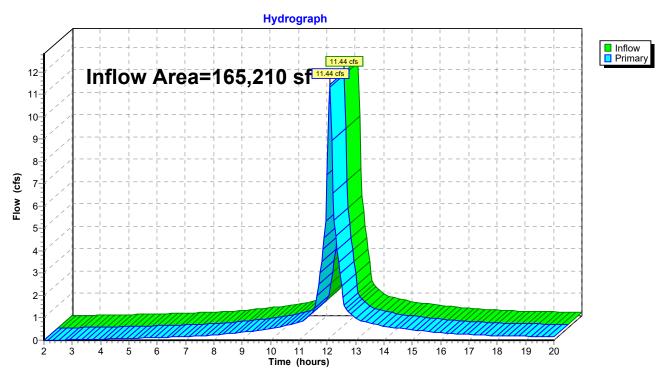
Inflow Area = 165,210 sf, 98.31% Impervious, Inflow Depth > 2.75" for 2-Year event

Inflow = 11.44 cfs @ 12.09 hrs, Volume= 37,803 cf

Primary = 11.44 cfs @ 12.09 hrs, Volume= 37,803 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-1: Mill Brook



Primary (cfs) 0.51 0.47 0.44 0.40 0.37 0.33 0.31 0.29 0.28 0.26 0.25 0.23 0.22 0.20 0.19 0.19 0.18 0.18 0.17 0.17 0.17 0.16

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 12

Hydrograph for Link POA-1: Mill Brook

			,,			
Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.00	0.00	0.00	14.75	0.51	0.00
2.25	0.01	0.00	0.01	15.00	0.47	0.00
2.50	0.01	0.00	0.01	15.25	0.44	0.00
2.75	0.02	0.00	0.02	15.50	0.40	0.00
3.00	0.03	0.00	0.03	15.75	0.37	0.00
3.25	0.03	0.00	0.03	16.00	0.33	0.00
3.50	0.04	0.00	0.04	16.25	0.31	0.00
3.75	0.05	0.00	0.05	16.50	0.29	0.00
4.00	0.05	0.00	0.05	16.75	0.28	0.00
4.25	0.06	0.00	0.06	17.00	0.26	0.00
4.50	0.07	0.00	0.07	17.25	0.25	0.00
4.75	0.08	0.00	0.08	17.50	0.23	0.00
5.00	0.08	0.00	0.08	17.75	0.22	0.00
5.25	0.09	0.00	0.09	18.00	0.20	0.00
5.50	0.10	0.00	0.10	18.25	0.19	0.00
5.75	0.11	0.00	0.11	18.50	0.19	0.00
6.00	0.11	0.00	0.11	18.75	0.18	0.00
6.25	0.12	0.00	0.12	19.00	0.18	0.00
6.50	0.14	0.00	0.14	19.25	0.17	0.00
6.75	0.15	0.00	0.15	19.50	0.17	0.00
7.00	0.17	0.00	0.17	19.75	0.17	0.00
7.25	0.18	0.00	0.18	20.00	0.16	0.00
7.50	0.20	0.00	0.20			
7.75	0.22	0.00	0.22			
8.00	0.23	0.00	0.23			
8.25	0.26	0.00	0.26			
8.50	0.29	0.00	0.29			
8.75	0.33	0.00	0.33			
9.00	0.36	0.00	0.36			
9.25	0.40	0.00	0.40			
9.50	0.44	0.00	0.44			
9.75	0.47	0.00	0.47			
10.00	0.51	0.00	0.51			
10.25	0.57	0.00	0.57			
10.50	0.65	0.00	0.65			
10.75	0.72	0.00	0.72			
11.00	0.80	0.00	0.80			
11.25	0.99	0.00	0.99			
11.50	1.27	0.00	1.27			
11.75	3.01	0.00	3.01			
12.00	7.40	0.00	7.40			
12.25 12.50	5.38	0.00	5.38			
	2.44	0.00	2.44			
12.75 13.00	1.27 0.99	0.00 0.00	1.27 0.99			
13.00	0.99	0.00	0.99			
13.25	0.64	0.00	0.6 4 0.77			
13.75	0.77	0.00	0.77			
14.00	0.70	0.00	0.70			
14.00	0.63	0.00	0.58			
14.23	0.54	0.00	0.54			
17.50	0.54	0.00	0.54			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 13

Summary for Link POA-2: Grove Street

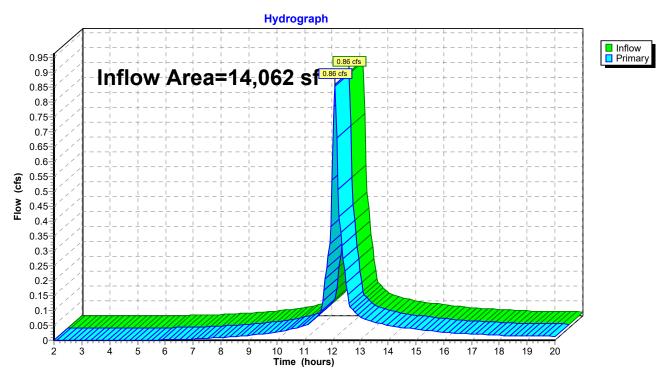
Inflow Area = 14,062 sf, 89.87% Impervious, Inflow Depth > 2.24" for 2-Year event

Inflow = 0.86 cfs @ 12.09 hrs, Volume= 2,630 cf

Primary = 0.86 cfs @ 12.09 hrs, Volume= 2,630 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-2: Grove Street



Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 14

Hydrograph for Link POA-2: Grove Street

Time	Inflow	Elevation	Primary	Time	Inflow	Elevation	Primary
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)	(cfs)
2.00	0.00	0.00	0.00	14.75	0.04	0.00	0.04
2.25	0.00	0.00	0.00	15.00	0.04	0.00	0.04
2.50	0.00	0.00	0.00	15.25	0.04	0.00	0.04
2.75	0.00	0.00	0.00	15.50	0.03	0.00	0.03
3.00	0.00	0.00	0.00	15.75	0.03	0.00	0.03
3.25	0.00	0.00	0.00	16.00 16.25	0.03	0.00 0.00	0.03
3.50 3.75	0.00	0.00 0.00	0.00 0.00	16.25	0.02 0.02	0.00	0.02 0.02
4.00	0.00	0.00	0.00	16.30	0.02	0.00	0.02
4.00	0.00	0.00	0.00	17.00	0.02	0.00	0.02
4.50	0.00	0.00	0.00	17.00	0.02	0.00	0.02
4.75	0.00	0.00	0.00	17.50	0.02	0.00	0.02
5.00	0.00	0.00	0.00	17.75	0.02	0.00	0.02
5.25	0.00	0.00	0.00	18.00	0.02	0.00	0.02
5.50	0.00	0.00	0.00	18.25	0.02	0.00	0.02
5.75	0.00	0.00	0.00	18.50	0.02	0.00	0.02
6.00	0.00	0.00	0.00	18.75	0.02	0.00	0.01
6.25	0.00	0.00	0.00	19.00	0.01	0.00	0.01
6.50	0.00	0.00	0.00	19.25	0.01	0.00	0.01
6.75	0.00	0.00	0.00	19.50	0.01	0.00	0.01
7.00	0.00	0.00	0.00	19.75	0.01	0.00	0.01
7.25	0.01	0.00	0.01	20.00	0.01	0.00	0.01
7.50	0.01	0.00	0.01				
7.75	0.01	0.00	0.01				
8.00	0.01	0.00	0.01				
8.25	0.01	0.00	0.01				
8.50	0.01	0.00	0.01				
8.75	0.01	0.00	0.01				
9.00	0.02	0.00	0.02				
9.25	0.02	0.00	0.02				
9.50	0.02	0.00	0.02				
9.75	0.02	0.00	0.02				
10.00	0.03	0.00	0.03				
10.25	0.03	0.00	0.03				
10.50	0.04	0.00	0.04				
10.75	0.04	0.00	0.04				
11.00	0.05	0.00	0.05				
11.25	0.06	0.00	0.06				
11.50 11.75	0.08 0.20	0.00 0.00	0.08 0.20				
12.00	0.20	0.00	0.20 0.54				
12.25	0.42	0.00	0.42				
12.50	0.19	0.00	0.19				
12.75	0.19	0.00	0.19				
13.00	0.10	0.00	0.10				
13.25	0.07	0.00	0.07				
13.50	0.06	0.00	0.06				
13.75	0.06	0.00	0.06				
14.00	0.05	0.00	0.05				
14.25	0.05	0.00	0.05				
14.50	0.04	0.00	0.04				
				I			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 15

Summary for Link POA-3: Arlington High School

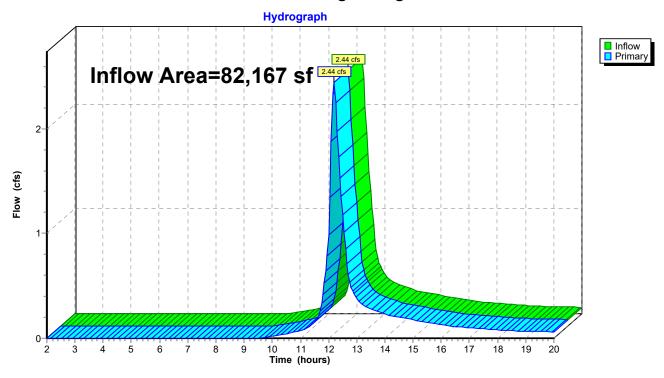
Inflow Area = 82,167 sf, 69.43% Impervious, Inflow Depth > 1.31" for 2-Year event

Inflow = 2.44 cfs @ 12.19 hrs, Volume= 8,990 cf

Primary = 2.44 cfs @ 12.19 hrs, Volume= 8,990 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-3: Arlington High School



HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 16

Hydrograph for Link POA-3: Arlington High School

		•	•		•	•	
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
2.00	0.00	0.00	0.00	14.75	0.19	0.00	0.19
2.25	0.00	0.00	0.00	15.00	0.18	0.00	0.18
2.50	0.00	0.00	0.00	15.25	0.16	0.00	0.16
2.75	0.00	0.00	0.00	15.50	0.15	0.00	0.15
3.00	0.00	0.00	0.00	15.75	0.13	0.00	0.13
3.25	0.00	0.00	0.00	16.00	0.14	0.00	0.14
3.50	0.00	0.00	0.00	16.25	0.13	0.00	0.13
3.75	0.00	0.00	0.00	16.50	0.12	0.00	0.12
4.00	0.00	0.00	0.00	16.75	0.11	0.00	0.11
4.25	0.00	0.00	0.00	17.00	0.10	0.00	0.11
4.50	0.00	0.00	0.00	17.25	0.09	0.00	0.09
4.75	0.00	0.00	0.00	17.50	0.09	0.00	0.09
5.00	0.00	0.00	0.00	17.75	0.08	0.00	0.08
5.25	0.00	0.00	0.00	18.00	0.08	0.00	0.08
5.50	0.00	0.00	0.00	18.25	0.07	0.00	0.07
5.75	0.00	0.00	0.00	18.50	0.07	0.00	0.07
6.00	0.00	0.00	0.00	18.75	0.07	0.00	0.07
6.25	0.00	0.00	0.00	19.00	0.07	0.00	0.07
6.50	0.00	0.00	0.00	19.25	0.07	0.00	0.07
6.75	0.00	0.00	0.00	19.50	0.07	0.00	0.07
7.00	0.00	0.00	0.00	19.75	0.06	0.00	0.06
7.25	0.00	0.00	0.00	20.00	0.06	0.00	0.06
7.50	0.00	0.00	0.00				
7.75	0.00	0.00	0.00				
8.00	0.00	0.00	0.00				
8.25	0.00	0.00	0.00				
8.50	0.00	0.00	0.00				
8.75	0.00	0.00	0.00				
9.00	0.00	0.00	0.00				
9.25	0.00	0.00	0.00				
9.50	0.00	0.00	0.00				
9.75	0.01	0.00	0.01				
10.00	0.02	0.00	0.02				
10.25	0.03	0.00	0.03				
10.50 10.75	0.04 0.06	0.00 0.00	0.04 0.06				
11.00	0.08	0.00	0.08				
11.25	0.00	0.00	0.00				
11.50	0.16	0.00	0.16				
11.75	0.10	0.00	0.33				
12.00	0.99	0.00	0.99				
12.25	2.25	0.00	2.25				
12.50	1.18	0.00	1.18				
12.75	0.54	0.00	0.54				
13.00	0.38	0.00	0.38				
13.25	0.31	0.00	0.31				
13.50	0.28	0.00	0.28				
13.75	0.26	0.00	0.26				
14.00	0.23	0.00	0.23				
14.25	0.21	0.00	0.21				
14.50	0.20	0.00	0.20				

Existing Conditions - NOAA ++ Rainfall Type III 24-hr 10-Year Rainfall=4.88"

Prepared by Weston & Sampson

Printed 11/25/2020

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 17

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: DA-2 Runoff Area=165,210 sf 98.31% Impervious Runoff Depth>4.31"

Tc=6.0 min CN=97 Runoff=17.55 cfs 59,359 cf

SubcatchmentDA-2: DA-2 Runoff Area=14,062 sf 89.87% Impervious Runoff Depth>3.76"

Tc=6.0 min CN=92 Runoff=1.40 cfs 4,410 cf

SubcatchmentDA-3: DA-3 Runoff Area=82,167 sf 69.43% Impervious Runoff Depth>2.60"

Flow Length=337' Tc=13.3 min CN=80 Runoff=4.84 cfs 17,784 cf

Link POA-1: Mill Brook Inflow=17.55 cfs 59,359 cf

Primary=17.55 cfs 59,359 cf

Link POA-2: Grove Street Inflow=1.40 cfs 4,410 cf

Primary=1.40 cfs 4,410 cf

Link POA-3: Arlington High School Inflow=4.84 cfs 17,784 cf

Primary=4.84 cfs 17,784 cf

Total Runoff Area = 261,439 sf Runoff Volume = 81,552 cf Average Runoff Depth = 3.74" 11.22% Pervious = 29,333 sf 88.78% Impervious = 232,106 sf

Page 18

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

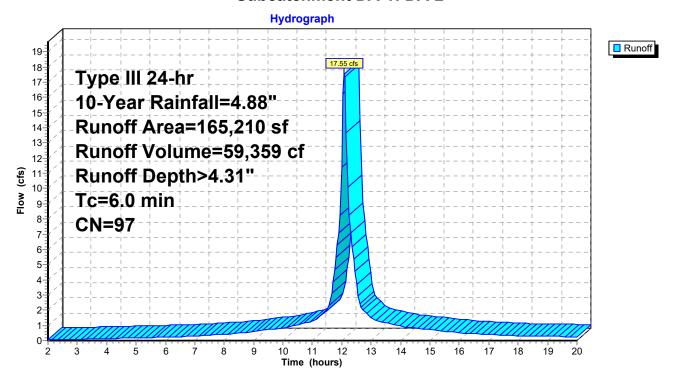
Summary for Subcatchment DA-1: DA-2

Runoff = 17.55 cfs @ 12.09 hrs, Volume= 59,359 cf, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.88"

	Aı	rea (sf)	CN	Description		
		2,792	49	50-75% Gra	Fair, HSG A	
	1	62,418	98	Paved park	Α	
	1	65,210	97	Weighted A	verage	
2,792 1.69% Pervious Area					ious Area	
	162,418		98.31% Imp	ervious Ar	rea	
	Тс	Length	Slope	e Velocity	Capacity	Description
	in)	(feet)	(ft/ft	,	(cfs)	Beschption
	3.0	(,	(1211	()	(3.3)	Direct Entry.

Subcatchment DA-1: DA-2



Runoff (cfs) 0.77 0.72 0.66 0.61 0.56 0.50 0.47 0.45 0.42 0.40 0.38 0.35 0.33 0.31 0.29 0.29 0.28 0.27 0.27 0.26 0.25 0.24 Page 19

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Hydrograph for Subcatchment DA-1: DA-2

			nyarog	iapii ioi	Oubout	J
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00 2.25	0.10 0.11	0.00 0.01	0.03	14.75 15.00	4.12 4.17	3.77 3.82
2.50	0.11	0.01	0.04 0.06	15.00	4.17	3.86
2.75	0.14	0.01	0.07	15.50	4.25	3.90
3.00	0.15	0.02	0.08	15.75	4.29	3.94
3.25	0.16	0.03	0.09	16.00	4.32	3.97
3.50 3.75	0.18 0.19	0.03 0.04	0.10 0.12	16.25 16.50	4.35 4.38	4.00 4.03
4.00	0.19	0.04	0.12	16.75	4.41	4.06
4.25	0.23	0.06	0.14	17.00	4.44	4.09
4.50	0.24	0.07	0.15	17.25	4.46	4.11
4.75	0.26	80.0	0.16	17.50	4.49 4.51	4.14
5.00 5.25	0.28 0.29	0.09 0.10	0.17 0.18	17.75 18.00	4.53	4.16 4.18
5.50	0.23	0.11	0.19	18.25	4.55	4.20
5.75	0.33	0.13	0.20	18.50	4.57	4.22
6.00	0.35	0.14	0.22	18.75	4.59	4.23
6.25 6.50	0.37 0.39	0.16 0.17	0.23 0.26	19.00 19.25	4.60 4.62	4.25 4.27
6.75	0.42	0.17	0.28	19.50	4.64	4.29
7.00	0.44	0.21	0.30	19.75	4.65	4.30
7.25	0.47	0.23	0.33	20.00	4.67	4.32
7.50 7.75	0.50 0.53	0.25 0.28	0.35 0.38			
8.00	0.56	0.20	0.40			
8.25	0.59	0.33	0.45			
8.50	0.63	0.37	0.50			
8.75 9.00	0.67 0.71	0.40 0.44	0.55 0.61			
9.00	0.71	0.44	0.66			
9.50	0.81	0.53	0.72			
9.75	0.86	0.58	0.77			
10.00	0.92	0.63	0.83			
10.25 10.50	0.99 1.06	0.69 0.76	0.92 1.03			
10.75	1.13	0.83	1.15			
11.00	1.22	0.91	1.26			
11.25	1.32	1.01	1.57			
11.50 11.75	1.45 1.73	1.14 1.41	1.99 4.67			
12.00	2.44	2.10	11.39			
12.25	3.15	2.80	8.22			
12.50	3.43	3.08	3.72			
12.75 13.00	3.56 3.66	3.21 3.31	1.94 1.51			
13.25	3.75	3.40	1.28			
13.50	3.82	3.48	1.17			
13.75	3.89	3.55	1.06			
14.00	3.96	3.61	0.95			
14.25	4.02	3.67	0.88			

3.72

0.82

4.07

14.50

Page 20

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

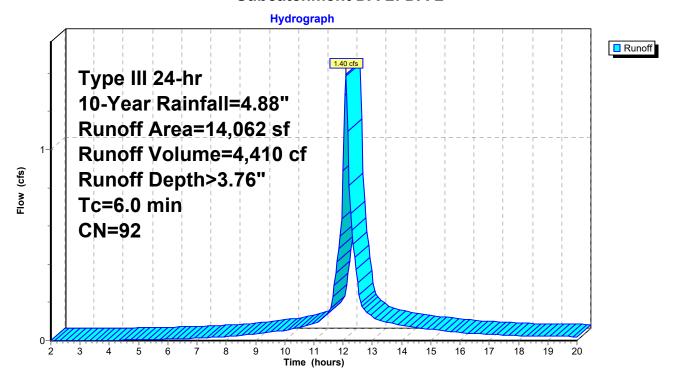
Summary for Subcatchment DA-2: DA-2

Runoff = 1.40 cfs @ 12.09 hrs, Volume= 4,410 cf, Depth> 3.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.88"

_	Ar	ea (sf)	CN	Description					
		1,425	39	>75% Grass cover, Good, HSG A					
_	•	12,637	98	Paved parking, HSG A					
	14,062 92 Weighted Average								
		1,425		10.13% Per	rvious Area				
12,637 89.87% Impervious Are						ea			
	_								
		Length	Slope	,	Capacity	Description			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	6.0					Direct Entry.			

Subcatchment DA-2: DA-2



Runoff (cfs)

0.06

0.06

0.05

0.05

0.05 0.04

0.04

0.04

0.04

0.03

0.03

0.03

0.03 0.03

0.02

0.02

0.02

0.02

0.02 0.02

0.02

Page 21

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Hydrograph for Subcatchment DA-2: DA-2

			riyurog	ιαριι ισι	Subcati	JIIIII G IIL I
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00	0.10	0.00	0.00	14.75	4.12	3.23
2.25 2.50	0.11 0.12	0.00	0.00 0.00	15.00 15.25	4.17 4.21	3.28 3.32
2.75	0.12	0.00	0.00	15.25	4.25	3.36
3.00	0.15	0.00	0.00	15.75	4.29	3.40
3.25	0.16	0.00	0.00	16.00	4.32	3.43
3.50	0.18	0.00	0.00	16.25	4.35	3.46
3.75	0.19	0.00	0.00	16.50	4.38	3.49
4.00	0.21	0.00	0.00	16.75	4.41	3.52
4.25 4.50	0.23	0.00 0.01	0.00 0.00	17.00 17.25	4.44 4.46	3.54 3.57
4.75	0.24 0.26	0.01	0.00	17.23	4.49	3.59
5.00	0.28	0.01	0.00	17.75	4.51	3.61
5.25	0.29	0.01	0.01	18.00	4.53	3.63
5.50	0.31	0.02	0.01	18.25	4.55	3.65
5.75	0.33	0.02	0.01	18.50	4.57	3.67
6.00	0.35	0.03	0.01	18.75	4.59	3.68
6.25	0.37	0.04 0.04	0.01	19.00 19.25	4.60 4.62	3.70
6.50 6.75	0.39 0.42	0.04	0.01 0.01	19.25	4.62	3.72 3.74
7.00	0.42	0.03	0.01	19.75	4.65	3.75
7.25	0.47	0.07	0.01	20.00	4.67	3.77
7.50	0.50	0.09	0.02			
7.75	0.53	0.10	0.02			
8.00	0.56	0.12	0.02			
8.25	0.59	0.13	0.02			
8.50 8.75	0.63 0.67	0.16 0.18	0.03 0.03			
9.00	0.07	0.18	0.03			
9.25	0.76	0.24	0.04			
9.50	0.81	0.27	0.04			
9.75	0.86	0.31	0.05			
10.00	0.92	0.35	0.05			
10.25	0.99	0.39	0.06			
10.50 10.75	1.06 1.13	0.44 0.50	0.07 0.08			
11.00	1.13	0.57	0.08			
11.25	1.32	0.65	0.11			
11.50	1.45	0.76	0.15			
11.75	1.73	1.00	0.35			
12.00	2.44	1.64	0.89			
12.25	3.15	2.30	0.67			
12.50	3.43	2.57	0.30 0.16			
12.75 13.00	3.56 3.66	2.69 2.79	0.16			
13.25	3.75	2.79	0.12			
13.50	3.82	2.95	0.10			
13.75	3.89	3.02	0.09			
14.00	3.96	3.08	0.08			
14.25	4.02	3.13	0.07			
7/1 6/1	7 (1 /	2 7 (1	0.07			

14.50

4.07

3.19

0.07

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 22

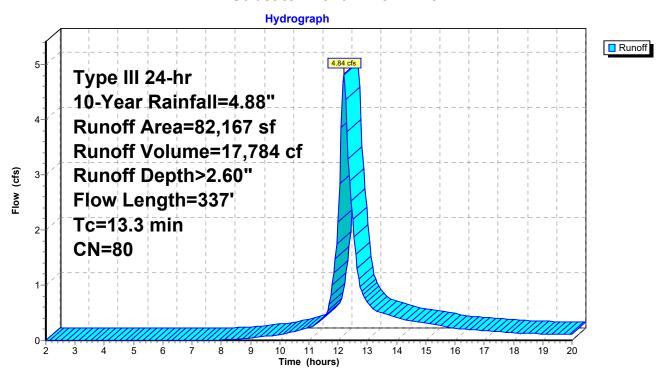
Summary for Subcatchment DA-3: DA-3

Runoff = 4.84 cfs @ 12.19 hrs, Volume= 17,784 cf, Depth> 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.88"

_	Α	rea (sf)	CN [Description							
		25,116 39 >75% Grass cover, Good, HSG A									
_		57,051	051 98 Paved parking, HSG A								
82,167 80 Weighted Average											
		25,116	3	30.57% Pe	rvious Area						
		57,051	6	59.43% Imp	pervious Ar	ea					
	_		-								
	Tc	Length	Slope	•	Capacity	Description					
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
	11.1	100	0.0150	0.15		Sheet Flow,					
						Grass: Short n= 0.150 P2= 3.12"					
	1.8	112	0.0210	1.01		Shallow Concentrated Flow,					
						Short Grass Pasture Kv= 7.0 fps					
	0.4	125	0.0080	5.27	4.14	1					
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'					
						n= 0.010 PVC, smooth interior					
	13 3	337	Total								

Subcatchment DA-3: DA-3



Runoff (cfs) 0.33 0.31 0.29 0.27 0.24 0.22 0.20 0.19 0.18 0.17 0.16 0.15 0.14 0.13 0.13 0.12 0.12 0.12 0.11 0.11 0.11 0.11 Page 23

14.50

4.07

2.10

0.35

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Hydrograph for Subcatchment DA-3: DA-3

			n y an o g	iapii ioi	Oubout	J
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00	0.10	0.00	0.00	14.75	4.12	2.14
2.25	0.11	0.00	0.00	15.00	4.17	2.18
2.50	0.12	0.00	0.00	15.25	4.21	2.22
2.75	0.14	0.00	0.00	15.50	4.25	2.25
3.00	0.15	0.00	0.00	15.75	4.29 4.32	2.28
3.25 3.50	0.16 0.18	0.00	0.00 0.00	16.00 16.25	4.32	2.31 2.34
3.75	0.18	0.00	0.00	16.25	4.38	2.34
4.00	0.13	0.00	0.00	16.75	4.41	2.39
4.25	0.23	0.00	0.00	17.00	4.44	2.41
4.50	0.24	0.00	0.00	17.25	4.46	2.43
4.75	0.26	0.00	0.00	17.50	4.49	2.45
5.00	0.28	0.00	0.00	17.75	4.51	2.47
5.25	0.29	0.00	0.00	18.00	4.53	2.49
5.50	0.31	0.00	0.00	18.25	4.55	2.50
5.75	0.33	0.00	0.00	18.50	4.57	2.52
6.00	0.35	0.00	0.00	18.75	4.59	2.53
6.25	0.37	0.00	0.00	19.00	4.60	2.55
6.50 6.75	0.39 0.42	0.00	0.00 0.00	19.25 19.50	4.62 4.64	2.56 2.58
7.00	0.42	0.00	0.00	19.50	4.65	2.59
7.00	0.44	0.00	0.00	20.00	4.67	2.61
7.50	0.50	0.00	0.00	20.00	4.07	2.01
7.75	0.53	0.00	0.00			
8.00	0.56	0.00	0.01			
8.25	0.59	0.00	0.01			
8.50	0.63	0.01	0.02			
8.75	0.67	0.01	0.03			
9.00	0.71	0.02	0.04			
9.25	0.76	0.02	0.05			
9.50	0.81	0.03	0.07			
9.75 10.00	0.86 0.92	0.05 0.06	0.09 0.11			
10.00	0.92	0.08	0.11			
10.50	1.06	0.00	0.16			
10.75	1.13	0.13	0.19			
11.00	1.22	0.16	0.23			
11.25	1.32	0.20	0.30			
11.50	1.45	0.26	0.41			
11.75	1.73	0.41	0.81			
12.00	2.44	0.85	2.15			
12.25	3.15	1.36	4.38			
12.50	3.43	1.58	2.19			
12.75	3.56	1.68	0.97			
13.00	3.66	1.76	0.69			
13.25 13.50	3.75 3.82	1.83 1.90	0.55 0.50			
13.75	3.89	1.95	0.30			
14.00	3.96	2.01	0.43			
14.25	4.02	2.05	0.37			
11.20	1.02	2.00	0.07	1		

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 24

Summary for Link POA-1: Mill Brook

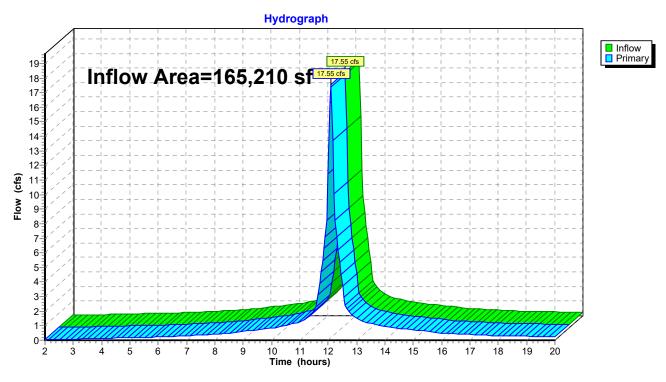
Inflow Area = 165,210 sf, 98.31% Impervious, Inflow Depth > 4.31" for 10-Year event

Inflow = 17.55 cfs @ 12.09 hrs, Volume= 59,359 cf

Primary = 17.55 cfs @ 12.09 hrs, Volume= 59,359 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-1: Mill Brook



Primary (cfs) 0.77 0.72 0.66 0.61 0.56 0.50 0.47 0.45 0.42 0.40 0.38 0.35 0.33 0.31 0.29 0.29 0.28 0.27 0.27 0.26 0.25 0.24

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 25

Hydrograph for Link POA-1: Mill Brook

			, .			
Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.03	0.00	0.03	14.75	0.77	0.00
2.25	0.04	0.00	0.04	15.00	0.72	0.00
2.50	0.06	0.00	0.06	15.25	0.66	0.00
2.75	0.07	0.00	0.07	15.50	0.61	0.00
3.00	0.08	0.00	0.08	15.75	0.56	0.00
3.25	0.09	0.00	0.09	16.00	0.50	0.00
3.50	0.10	0.00	0.10	16.25	0.47	0.00
3.75	0.12	0.00	0.12	16.50	0.45	0.00
4.00	0.13 0.14	0.00	0.13 0.14	16.75	0.42	0.00 0.00
4.25 4.50	0.14	0.00 0.00	0.14	17.00 17.25	0.40 0.38	0.00
4.75	0.15	0.00	0.15	17.23	0.35	0.00
5.00	0.10	0.00	0.10	17.75	0.33	0.00
5.25	0.17	0.00	0.17	18.00	0.31	0.00
5.50	0.19	0.00	0.19	18.25	0.29	0.00
5.75	0.20	0.00	0.20	18.50	0.29	0.00
6.00	0.22	0.00	0.22	18.75	0.28	0.00
6.25	0.23	0.00	0.23	19.00	0.27	0.00
6.50	0.26	0.00	0.26	19.25	0.27	0.00
6.75	0.28	0.00	0.28	19.50	0.26	0.00
7.00	0.30	0.00	0.30	19.75	0.25	0.00
7.25	0.33	0.00	0.33	20.00	0.24	0.00
7.50	0.35	0.00	0.35			
7.75	0.38	0.00	0.38			
8.00	0.40	0.00	0.40			
8.25	0.45	0.00	0.45			
8.50	0.50	0.00	0.50			
8.75	0.55	0.00	0.55			
9.00	0.61	0.00	0.61			
9.25 9.50	0.66 0.72	0.00 0.00	0.66 0.72			
9.75	0.72	0.00	0.72			
10.00	0.77	0.00	0.83			
10.25	0.92	0.00	0.92			
10.50	1.03	0.00	1.03			
10.75	1.15	0.00	1.15			
11.00	1.26	0.00	1.26			
11.25	1.57	0.00	1.57			
11.50	1.99	0.00	1.99			
11.75	4.67	0.00	4.67			
12.00	11.39	0.00	11.39			
12.25	8.22	0.00	8.22			
12.50	3.72	0.00	3.72			
12.75	1.94	0.00	1.94			
13.00	1.51	0.00	1.51			
13.25	1.28	0.00	1.28			
13.50	1.17	0.00	1.17			
13.75 14.00	1.06 0.95	0.00 0.00	1.06 0.95			
14.00	0.95	0.00	0.95			
14.25	0.82	0.00	0.82			
17.50	0.02	0.00	0.02			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 26

Summary for Link POA-2: Grove Street

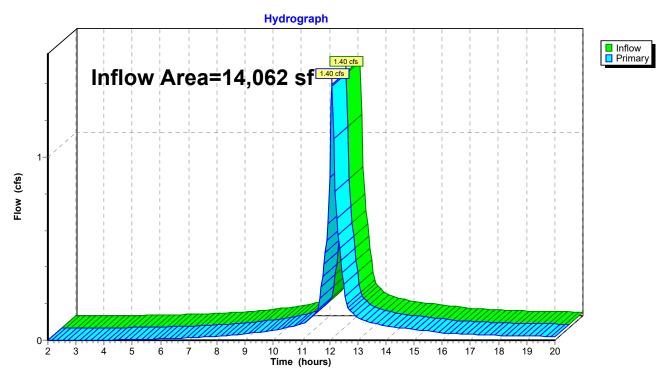
Inflow Area = 14,062 sf, 89.87% Impervious, Inflow Depth > 3.76" for 10-Year event

Inflow = 1.40 cfs @ 12.09 hrs, Volume= 4,410 cf

Primary = 1.40 cfs @ 12.09 hrs, Volume= 4,410 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-2: Grove Street



Primary (cfs) 0.06 0.06 0.05 0.05 0.05 0.04 0.04 0.04 0.04 0.03 0.03 0.03 0.03 0.03 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 27

Hydrograph for Link POA-2: Grove Street

Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.00	0.00	0.00	14.75	0.06	0.00
2.25	0.00	0.00	0.00	15.00	0.06	0.00
2.50	0.00	0.00	0.00	15.25	0.05	0.00
2.75	0.00	0.00	0.00	15.50	0.05	0.00
3.00	0.00	0.00	0.00	15.75	0.05	0.00
3.25	0.00	0.00	0.00	16.00	0.04	0.00
3.50	0.00	0.00	0.00	16.25	0.04	0.00
3.75	0.00	0.00	0.00	16.50	0.04	0.00
4.00	0.00	0.00	0.00	16.75	0.04	0.00
4.25 4.50	0.00 0.00	0.00 0.00	0.00 0.00	17.00 17.25	0.03 0.03	0.00 0.00
4.75	0.00	0.00	0.00	17.50	0.03	0.00
5.00	0.00	0.00	0.00	17.30	0.03	0.00
5.25	0.00	0.00	0.00	18.00	0.03	0.00
5.50	0.01	0.00	0.01	18.25	0.02	0.00
5.75	0.01	0.00	0.01	18.50	0.02	0.00
6.00	0.01	0.00	0.01	18.75	0.02	0.00
6.25	0.01	0.00	0.01	19.00	0.02	0.00
6.50	0.01	0.00	0.01	19.25	0.02	0.00
6.75	0.01	0.00	0.01	19.50	0.02	0.00
7.00	0.01	0.00	0.01	19.75	0.02	0.00
7.25	0.01	0.00	0.01	20.00	0.02	0.00
7.50	0.02	0.00	0.02			
7.75	0.02	0.00	0.02			
8.00	0.02	0.00	0.02			
8.25	0.02	0.00	0.02			
8.50	0.03	0.00	0.03			
8.75	0.03	0.00	0.03			
9.00	0.04	0.00	0.04			
9.25	0.04	0.00	0.04			
9.50	0.04	0.00	0.04			
9.75	0.05	0.00	0.05			
10.00 10.25	0.05 0.06	0.00 0.00	0.05 0.06			
10.23	0.00	0.00	0.00			
10.75	0.07	0.00	0.07			
11.00	0.09	0.00	0.09			
11.25	0.11	0.00	0.11			
11.50	0.15	0.00	0.15			
11.75	0.35	0.00	0.35			
12.00	0.89	0.00	0.89			
12.25	0.67	0.00	0.67			
12.50	0.30	0.00	0.30			
12.75	0.16	0.00	0.16			
13.00	0.12	0.00	0.12			
13.25	0.11	0.00	0.11			
13.50	0.10	0.00	0.10			
13.75	0.09	0.00	0.09			
14.00	0.08	0.00	0.08			
14.25	0.07	0.00	0.07			
14.50	0.07	0.00	0.07			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 28

Summary for Link POA-3: Arlington High School

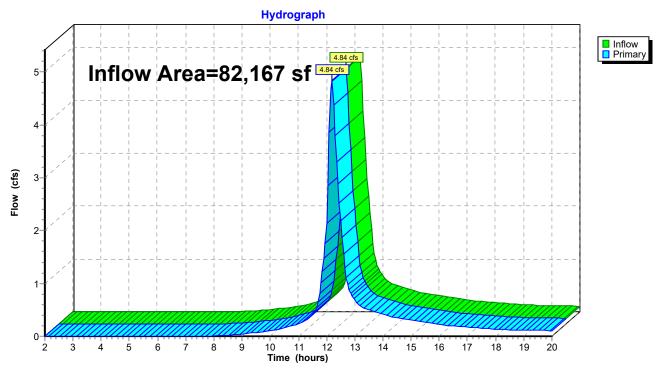
Inflow Area = 82,167 sf, 69.43% Impervious, Inflow Depth > 2.60" for 10-Year event

Inflow = 4.84 cfs @ 12.19 hrs, Volume= 17,784 cf

Primary = 4.84 cfs @ 12.19 hrs, Volume= 17,784 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-3: Arlington High School



Primary (cfs) 0.33 0.31 0.29 0.27 0.24 0.22 0.20 0.19 0.18 0.17 0.16 0.15 0.14 0.13 0.13 0.12 0.12 0.12 0.11 0.11 0.11 0.11

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 29

Hydrograph for Link POA-3: Arlington High School

		_	•		· ·	•
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)
2.00	0.00	0.00	0.00	14.75	0.33	0.00
2.25	0.00	0.00	0.00	15.00	0.31	0.00
2.50	0.00	0.00	0.00	15.25	0.29	0.00
2.75	0.00	0.00	0.00	15.50	0.27	0.00
3.00	0.00	0.00	0.00	15.75	0.24	0.00
3.25	0.00	0.00	0.00	16.00	0.22	0.00
3.50	0.00	0.00	0.00	16.25	0.20	0.00
3.75	0.00	0.00	0.00	16.50	0.19	0.00
4.00	0.00	0.00	0.00	16.75	0.18	0.00
4.25	0.00	0.00	0.00	17.00	0.17	0.00
4.50	0.00	0.00	0.00	17.25	0.16	0.00
4.75	0.00	0.00	0.00	17.50	0.15	0.00
5.00	0.00	0.00	0.00	17.75	0.14	0.00
5.25	0.00	0.00	0.00	18.00	0.13	0.00
5.50	0.00	0.00	0.00	18.25	0.13	0.00
5.75	0.00	0.00	0.00	18.50	0.12	0.00
6.00	0.00	0.00	0.00	18.75	0.12	0.00
6.25	0.00	0.00	0.00	19.00	0.12	0.00
6.50	0.00	0.00	0.00	19.25	0.11	0.00
6.75	0.00	0.00	0.00	19.50	0.11	0.00
7.00	0.00	0.00	0.00	19.75	0.11	0.00
7.25	0.00	0.00	0.00	20.00	0.11	0.00
7.50	0.00	0.00	0.00			
7.75	0.00	0.00	0.00			
8.00	0.01	0.00	0.01			
8.25	0.01	0.00	0.01			
8.50 8.75	0.02 0.03	0.00 0.00	0.02 0.03			
9.00	0.03	0.00	0.03			
9.00	0.04	0.00	0.04			
9.50	0.03	0.00	0.03			
9.75	0.09	0.00	0.09			
10.00	0.11	0.00	0.11			
10.25	0.13	0.00	0.13			
10.50	0.16	0.00	0.16			
10.75	0.19	0.00	0.19			
11.00	0.23	0.00	0.23			
11.25	0.30	0.00	0.30			
11.50	0.41	0.00	0.41			
11.75	0.81	0.00	0.81			
12.00	2.15	0.00	2.15			
12.25	4.38	0.00	4.38			
12.50	2.19	0.00	2.19			
12.75	0.97	0.00	0.97			
13.00	0.69	0.00	0.69			
13.25	0.55	0.00	0.55			
13.50	0.50	0.00	0.50			
13.75	0.45	0.00	0.45			
14.00 14.25	0.41 0.37	0.00 0.00	0.41 0.37			
14.25	0.37	0.00	0.37			
14.50	0.33	0.00	บ.งง			

Existing Conditions - NOAA ++ Rainfall Type III 24-hr 25-Year Rainfall=6.19"

Prepared by Weston & Sampson

Printed 11/25/2020

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 30

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: DA-2 Runoff Area=165,210 sf 98.31% Impervious Runoff Depth>5.55"

Tc=6.0 min CN=97 Runoff=22.37 cfs 76,472 cf

SubcatchmentDA-2: DA-2 Runoff Area=14,062 sf 89.87% Impervious Runoff Depth>4.99"

Tc=6.0 min CN=92 Runoff=1.82 cfs 5,847 cf

SubcatchmentDA-3: DA-3 Runoff Area=82,167 sf 69.43% Impervious Runoff Depth>3.70"

Flow Length=337' Tc=13.3 min CN=80 Runoff=6.83 cfs 25,330 cf

Link POA-1: Mill Brook Inflow=22.37 cfs 76,472 cf

Primary=22.37 cfs 76,472 cf

Link POA-2: Grove Street Inflow=1.82 cfs 5,847 cf

Primary=1.82 cfs 5,847 cf

Link POA-3: Arlington High School Inflow=6.83 cfs 25,330 cf

Primary=6.83 cfs 25,330 cf

Total Runoff Area = 261,439 sf Runoff Volume = 107,648 cf Average Runoff Depth = 4.94" 11.22% Pervious = 29,333 sf 88.78% Impervious = 232,106 sf

Page 31

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

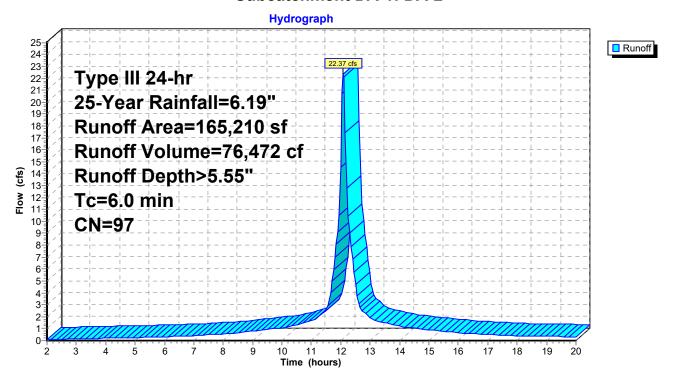
Summary for Subcatchment DA-1: DA-2

Runoff = 22.37 cfs @ 12.09 hrs, Volume= 76,472 cf, Depth> 5.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.19"

	Α	rea (sf)	CN	Description		
		2,792	49	50-75% Gra	ass cover, f	Fair, HSG A
_	1	62,418	98	Paved park	ing, HSG A	Α
	1	65,210	97	Weighted A	verage	
		2,792		1.69% Perv	ious Area	
	1	62,418		98.31% Imp	ervious Ar	rea
	Tc	Length	Slope	,	Capacity	Description
-	(min)	(feet)	(ft/ft) (ft/sec)	(cfs)	
	6.0					Direct Entry.

Subcatchment DA-1: DA-2



Runoff (cfs) 0.98

> 0.91 0.84

> 0.77 0.71

0.64 0.60 0.57 0.54 0.51 0.48 0.45

0.42

0.39

0.37 0.36

0.35

0.35

0.34 0.33

0.32

0.31

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 32

Hydrograph for Subcatchment DA-1: DA-2

			, ,	-		
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)
2.00	0.12	0.01	0.07	14.75	5.23	4.87
2.25	0.14	0.02	0.08	15.00	5.29	4.93
2.50	0.16	0.02	0.10	15.25	5.34	4.99
2.75	0.17	0.03	0.11	15.50	5.39	5.04
3.00	0.19	0.04	0.13	15.75	5.44	5.09
3.25	0.21	0.05	0.15	16.00	5.48	5.13
3.50	0.23	0.06	0.16	16.25	5.52	5.17
3.75	0.25	0.07	0.18	16.50	5.56	5.21
4.00	0.27	0.08	0.19	16.75	5.60	5.24
4.25	0.29	0.09	0.21	17.00	5.63	5.27
4.50	0.31	0.11	0.22	17.25	5.66	5.31
4.75	0.33	0.12	0.23	17.50	5.69	5.34
5.00	0.35	0.14	0.25	17.75	5.72	5.36
5.25	0.37	0.16	0.26	18.00	5.74	5.39
5.50	0.40	0.17	0.27	18.25	5.77	5.41
5.75	0.42	0.19	0.29	18.50	5.79	5.44
6.00	0.45	0.21	0.30	18.75	5.82	5.46
6.25	0.47	0.23	0.32	19.00	5.84	5.48
6.50	0.50	0.26	0.35	19.25	5.86	5.51
6.75	0.53	0.28	0.38	19.50	5.88	5.53
7.00	0.56	0.31	0.41	19.75	5.90	5.55
7.25	0.59	0.34	0.44	20.00	5.92	5.57
7.50	0.63	0.37	0.48			
7.75 8.00	0.67 0.71	0.40 0.43	0.51 0.54			
8.25	0.71	0.43	0.59			
8.50	0.73	0.47	0.66			
8.75	0.85	0.56	0.73			
9.00	0.90	0.61	0.80			
9.25	0.96	0.67	0.87			
9.50	1.03	0.73	0.94			
9.75	1.10	0.80	1.01			
10.00	1.17	0.87	1.08			
10.25	1.25	0.94	1.19			
10.50	1.34	1.03	1.34			
10.75	1.44	1.12	1.48			
11.00	1.55	1.23	1.62			
11.25	1.68	1.36	2.01			
11.50	1.84	1.52	2.55			
11.75	2.20	1.87	5.99			
12.00	3.09	2.75	14.54			
12.25	3.99	3.64	10.46			
12.50	4.35	4.00	4.73			
12.75 13.00	4.51 4.64	4.16 4.29	2.47 1.92			
13.00	4.04	4.49	1.63			
13.50	4.75	4.50	1.49			
13.75	4.94	4.59	1.35			
14.00	5.02	4.67	1.21			
14.25	5.09	4.74	1.11			
14.50	5.16	4.81	1.05			

Page 33

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

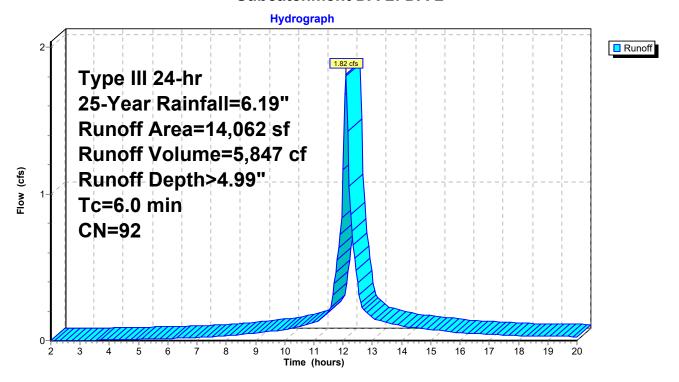
Summary for Subcatchment DA-2: DA-2

Runoff = 1.82 cfs @ 12.09 hrs, Volume= 5,847 cf, Depth> 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.19"

	Area (sf)	CN	Description			
	1,425	39	>75% Gras	s cover, Go	Good, HSG A	_
	12,637	98	Paved park	ing, HSG A	A	
	14,062	92	Weighted A	verage		
	1,425		10.13% Per	rvious Area	a	
	12,637		89.87% lmp	pervious Ar	ırea	
_		01			B	
To	5	Slope	,	Capacity	·	
(min)) (feet)	(ft/ft	(ft/sec)	(cfs)		
6.0)				Direct Entry.	

Subcatchment DA-2: DA-2



Runoff (cfs) 0.08 80.0 0.07 0.06 0.06 0.05 0.05 0.05 0.04 0.04 0.04 0.04 0.04 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 Page 34

14.50

5.16

4.25

0.09

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Hydrograph for Subcatchment DA-2: DA-2

			ny arog.	apii ioi	Oubout		
Time	Precip.	Excess	Runoff	Time	Precip.	Excess	
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)	
2.00	0.12	0.00	0.00	14.75	5.23	4.31	
2.25	0.14	0.00	0.00	15.00	5.29	4.37	
2.50	0.16	0.00	0.00	15.25	5.34	4.43	
2.75	0.17	0.00	0.00	15.50	5.39	4.48	
3.00	0.19	0.00	0.00	15.75	5.44	4.52	
3.25	0.21	0.00	0.00	16.00	5.48	4.56	
3.50	0.23	0.00	0.00	16.25	5.52	4.60	
3.75	0.25	0.01	0.00	16.50	5.56 5.60	4.64	
4.00 4.25	0.27 0.29	0.01 0.01	0.00 0.01	16.75 17.00	5.63	4.67 4.71	
4.23	0.29	0.01	0.01	17.00	5.66	4.71	
4.75	0.33	0.02	0.01	17.50	5.69	4.77	
5.00	0.35	0.02	0.01	17.75	5.72	4.79	
5.25	0.37	0.04	0.01	18.00	5.74	4.82	
5.50	0.40	0.05	0.01	18.25	5.77	4.84	
5.75	0.42	0.05	0.01	18.50	5.79	4.87	
6.00	0.45	0.06	0.01	18.75	5.82	4.89	
6.25	0.47	0.08	0.01	19.00	5.84	4.91	
6.50	0.50	0.09	0.02	19.25	5.86	4.93	
6.75	0.53	0.10	0.02	19.50	5.88	4.95	
7.00	0.56	0.12	0.02	19.75	5.90	4.97	
7.25	0.59	0.14	0.02	20.00	5.92	4.99	
7.50	0.63	0.16	0.03				
7.75	0.67	0.18	0.03				
8.00	0.71	0.20	0.03				
8.25 8.50	0.75 0.80	0.23 0.26	0.04 0.04				
8.75	0.85	0.20	0.04				
9.00	0.90	0.23	0.05				
9.25	0.96	0.38	0.06				
9.50	1.03	0.42	0.06				
9.75	1.10	0.47	0.07				
10.00	1.17	0.53	0.07				
10.25	1.25	0.60	0.08				
10.50	1.34	0.67	0.10				
10.75	1.44	0.75	0.11				
11.00	1.55	0.84	0.12				
11.25	1.68	0.95	0.15				
11.50	1.84	1.10	0.20				
11.75	2.20	1.42	0.47				
12.00 12.25	3.09	2.25	1.17				
12.25	3.99 4.35	3.11 3.45	0.86 0.39				
12.30	4.55	3.43	0.39				
13.00	4.64	3.74	0.20				
13.25	4.75	3.85	0.14				
13.50	4.85	3.94	0.12				
13.75	4.94	4.03	0.11				
14.00	5.02	4.11	0.10				
14.25	5.09	4.18	0.09				
44.50	E 40	4.05	0.00				

Page 35

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

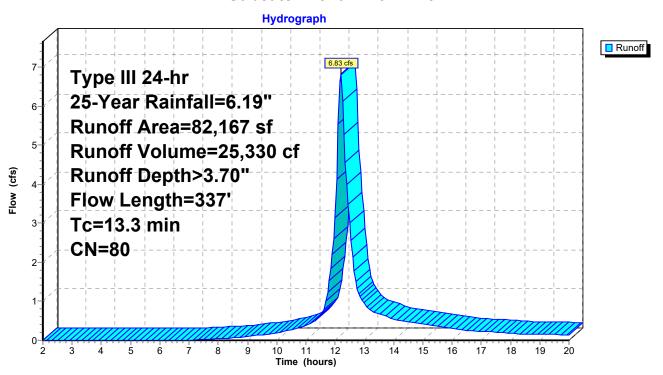
Summary for Subcatchment DA-3: DA-3

Runoff = 6.83 cfs @ 12.18 hrs, Volume= 25,330 cf, Depth> 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.19"

A	rea (sf)	CN E	Description		
	25,116	39 >	75% Gras	s cover, Go	ood, HSG A
	57,051	98 F	Paved park	ing, HSG A	
	82,167	80 V	Veighted A	verage	
	25,116	3	0.57% Pei	rvious Area	
	57,051	6	9.43% Imp	pervious Ar	ea
_				_	
Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
11.1	100	0.0150	0.15		Sheet Flow,
					Grass: Short n= 0.150 P2= 3.12"
1.8	112	0.0210	1.01		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
0.4	125	0.0080	5.27	4.14	•
					12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'
					n= 0.010 PVC, smooth interior
13.3	337	Total			

Subcatchment DA-3: DA-3



Runoff (cfs) 0.44 0.41 0.38 0.36 0.33 0.30 0.27 0.26 0.24 0.23 0.22 0.21 0.19 0.18 0.17 0.16 0.16 0.16 0.15 0.15 0.14 0.14 Page 36

14.50

5.16

3.04

0.47

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Hydrograph for Subcatchment DA-3: DA-3

			ny arog	. арт. тот	Oubout	J
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00	0.12	0.00	0.00	14.75	5.23	3.09
2.25	0.14	0.00	0.00	15.00	5.29	3.15
2.50	0.16	0.00	0.00	15.25	5.34	3.19
2.75 3.00	0.17 0.19	0.00	0.00 0.00	15.50 15.75	5.39 5.44	3.24 3.28
3.25	0.19	0.00	0.00	16.00	5.48	3.32
3.50	0.23	0.00	0.00	16.25	5.52	3.35
3.75	0.25	0.00	0.00	16.50	5.56	3.39
4.00	0.27	0.00	0.00	16.75	5.60	3.42
4.25	0.29	0.00	0.00	17.00	5.63	3.45
4.50	0.31	0.00	0.00	17.25	5.66	3.48
4.75	0.33	0.00	0.00	17.50 17.75	5.69 5.72	3.50
5.00 5.25	0.35 0.37	0.00	0.00 0.00	18.00	5.72	3.53 3.55
5.50	0.40	0.00	0.00	18.25	5.77	3.57
5.75	0.42	0.00	0.00	18.50	5.79	3.59
6.00	0.45	0.00	0.00	18.75	5.82	3.62
6.25	0.47	0.00	0.00	19.00	5.84	3.64
6.50	0.50	0.00	0.00	19.25	5.86	3.66
6.75	0.53	0.00	0.00	19.50	5.88	3.68
7.00 7.25	0.56 0.59	0.00	0.01 0.01	19.75 20.00	5.90 5.92	3.69 3.71
7.50	0.63	0.00	0.01	20.00	3.32	3.7 1
7.75	0.67	0.01	0.03			
8.00	0.71	0.02	0.04			
8.25	0.75	0.02	0.05			
8.50	0.80	0.03	0.06			
8.75	0.85	0.04	0.08			
9.00 9.25	0.90 0.96	0.06 0.07	0.10 0.12			
9.50	1.03	0.07	0.12			
9.75	1.10	0.11	0.17			
10.00	1.17	0.14	0.19			
10.25	1.25	0.17	0.23			
10.50	1.34	0.21	0.27			
10.75	1.44	0.26	0.33			
11.00 11.25	1.55 1.68	0.31 0.38	0.38 0.47			
11.50	1.84	0.38	0.64			
11.75	2.20	0.69	1.23			
12.00	3.09	1.32	3.14			
12.25	3.99	2.03	6.13			
12.50	4.35	2.33	3.01			
12.75	4.51	2.47	1.32			
13.00	4.64	2.58	0.93 0.74			
13.25 13.50	4.75 4.85	2.68 2.76	0.74 0.67			
13.75	4.94	2.70	0.61			
14.00	5.02	2.91	0.55			
14.25	5.09	2.97	0.50			
44.50	- 40	0.04	0.47			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 37

Summary for Link POA-1: Mill Brook

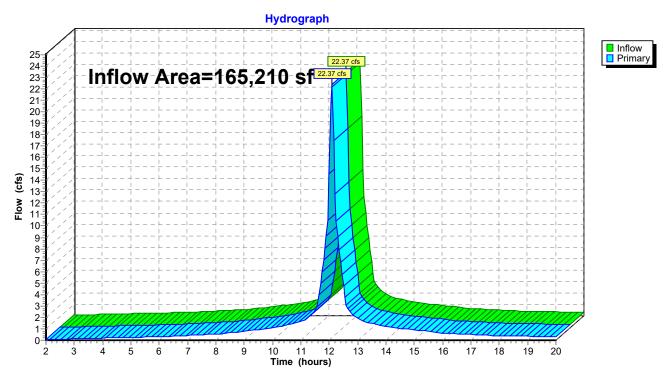
Inflow Area = 165,210 sf, 98.31% Impervious, Inflow Depth > 5.55" for 25-Year event

Inflow = 22.37 cfs @ 12.09 hrs, Volume= 76,472 cf

Primary = 22.37 cfs @ 12.09 hrs, Volume= 76,472 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-1: Mill Brook



Primary (cfs)

0.98

0.91

0.84

0.77

0.71

0.64

0.60 0.57

0.54

0.51

0.48

0.45

0.42

0.39

0.37 0.36

0.35

0.35 0.34

0.33

0.32

0.31

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 38

Hydrograph for Link POA-1: Mill Brook

			,			
Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.07	0.00	0.07	14.75	0.98	0.00
2.25	0.08	0.00	0.08	15.00	0.91	0.00
2.50	0.10	0.00	0.10	15.25	0.84	0.00
2.75	0.11	0.00	0.11	15.50	0.77	0.00
3.00	0.13	0.00	0.13	15.75	0.71	0.00
3.25	0.15	0.00	0.15	16.00	0.64	0.00
3.50	0.16	0.00	0.16	16.25	0.60	0.00
3.75	0.18	0.00	0.18	16.50	0.57	0.00
4.00	0.19	0.00	0.19	16.75	0.54	0.00
4.25	0.21	0.00	0.21	17.00	0.51	0.00
4.50	0.22	0.00	0.22	17.25	0.48	0.00
4.75	0.23	0.00	0.23	17.50	0.45	0.00
5.00	0.25	0.00	0.25	17.75	0.42	0.00
5.25	0.26	0.00	0.26	18.00	0.39 0.37	0.00
5.50 5.75	0.27 0.29	0.00 0.00	0.27 0.29	18.25 18.50	0.37	0.00 0.00
6.00	0.29	0.00	0.29	18.75	0.35	0.00
6.25	0.30	0.00	0.32	19.00	0.35	0.00
6.50	0.35	0.00	0.35	19.25	0.34	0.00
6.75	0.38	0.00	0.38	19.50	0.33	0.00
7.00	0.41	0.00	0.41	19.75	0.32	0.00
7.25	0.44	0.00	0.44	20.00	0.31	0.00
7.50	0.48	0.00	0.48		0.0.	0.00
7.75	0.51	0.00	0.51			
8.00	0.54	0.00	0.54			
8.25	0.59	0.00	0.59			
8.50	0.66	0.00	0.66			
8.75	0.73	0.00	0.73			
9.00	0.80	0.00	0.80			
9.25	0.87	0.00	0.87			
9.50	0.94	0.00	0.94			
9.75	1.01	0.00	1.01			
10.00	1.08	0.00	1.08			
10.25	1.19	0.00	1.19			
10.50	1.34	0.00	1.34			
10.75	1.48 1.62	0.00 0.00	1.48			
11.00			1.62			
11.25 11.50	2.01 2.55	0.00 0.00	2.01 2.55			
11.75	5.99	0.00	5.99			
12.00	14.54	0.00	14.54			
12.25	10.46	0.00	10.46			
12.50	4.73	0.00	4.73			
12.75	2.47	0.00	2.47			
13.00	1.92	0.00	1.92			
13.25	1.63	0.00	1.63			
13.50	1.49	0.00	1.49			
13.75	1.35	0.00	1.35			
14.00	1.21	0.00	1.21			
14.25	1.11	0.00	1.11			
14.50	1.05	0.00	1.05			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 39

Summary for Link POA-2: Grove Street

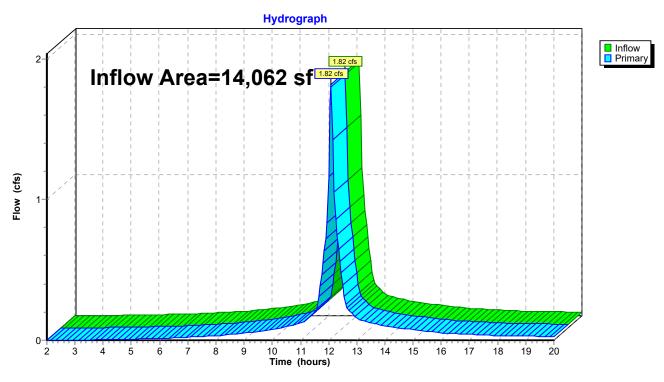
Inflow Area = 14,062 sf, 89.87% Impervious, Inflow Depth > 4.99" for 25-Year event

Inflow = 1.82 cfs @ 12.09 hrs, Volume= 5,847 cf

Primary = 1.82 cfs @ 12.09 hrs, Volume= 5,847 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-2: Grove Street



HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 40

Hydrograph for Link POA-2: Grove Street

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
2.00	0.00	0.00	0.00	14.75	0.08	0.00	0.08
2.25	0.00	0.00	0.00	15.00	0.08	0.00	0.08
2.50	0.00	0.00	0.00	15.25	0.07	0.00	0.07
2.75	0.00	0.00	0.00	15.50	0.06	0.00	0.06
3.00	0.00	0.00	0.00	15.75	0.06	0.00	0.06
3.25	0.00	0.00	0.00	16.00	0.05	0.00	0.05
3.50	0.00	0.00	0.00	16.25	0.05	0.00	0.05
3.75	0.00	0.00	0.00	16.50	0.05	0.00	0.05
4.00	0.00	0.00	0.00	16.75	0.04	0.00	0.04
4.25	0.01	0.00	0.01	17.00	0.04	0.00	0.04
4.50	0.01	0.00	0.01	17.25	0.04	0.00	0.04
4.75	0.01	0.00	0.01	17.50	0.04	0.00	0.04
5.00	0.01	0.00	0.01	17.75	0.04	0.00	0.04
5.25	0.01	0.00	0.01	18.00	0.03	0.00	0.03
5.50	0.01	0.00	0.01	18.25	0.03	0.00	0.03
5.75	0.01	0.00	0.01	18.50	0.03	0.00	0.03
6.00	0.01	0.00	0.01	18.75	0.03	0.00	0.03
6.25	0.01	0.00	0.01	19.00	0.03	0.00	0.03
6.50	0.02	0.00	0.02	19.25	0.03	0.00	0.03
6.75	0.02	0.00	0.02	19.50	0.03	0.00	0.03
7.00 7.25	0.02 0.02	0.00 0.00	0.02 0.02	19.75 20.00	0.03 0.03	0.00 0.00	0.03 0.03
7.25 7.50	0.02	0.00	0.02	20.00	0.03	0.00	0.03
7.30 7.75	0.03	0.00	0.03				
8.00	0.03	0.00	0.03				
8.25	0.04	0.00	0.03				
8.50	0.04	0.00	0.04				
8.75	0.05	0.00	0.05				
9.00	0.05	0.00	0.05				
9.25	0.06	0.00	0.06				
9.50	0.06	0.00	0.06				
9.75	0.07	0.00	0.07				
10.00	0.07	0.00	0.07				
10.25	0.08	0.00	0.08				
10.50	0.10	0.00	0.10				
10.75	0.11	0.00	0.11				
11.00	0.12	0.00	0.12				
11.25	0.15	0.00	0.15				
11.50	0.20	0.00	0.20				
11.75	0.47	0.00	0.47				
12.00	1.17	0.00	1.17				
12.25	0.86	0.00	0.86				
12.50	0.39	0.00	0.39				
12.75 13.00	0.20 0.16	0.00 0.00	0.20 0.16				
13.00	0.16	0.00	0.16				
13.25	0.14	0.00	0.14				
13.75	0.12	0.00	0.12				
14.00	0.11	0.00	0.11				
14.25	0.09	0.00	0.09				
14.50	0.09	0.00	0.09				

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 41

Summary for Link POA-3: Arlington High School

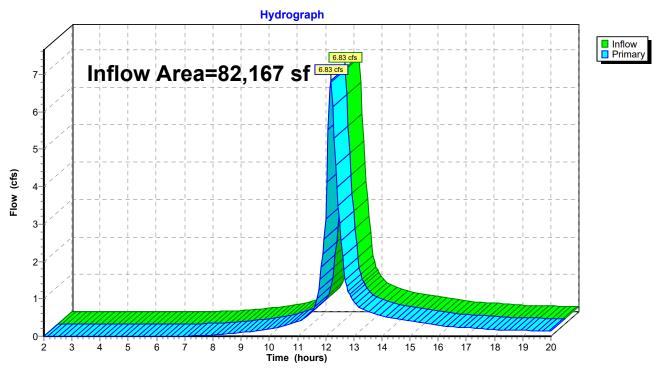
Inflow Area = 82,167 sf, 69.43% Impervious, Inflow Depth > 3.70" for 25-Year event

Inflow = 6.83 cfs @ 12.18 hrs, Volume= 25,330 cf

Primary = 6.83 cfs @ 12.18 hrs, Volume= 25,330 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-3: Arlington High School



Primary (cfs) 0.44 0.41 0.38 0.36 0.33 0.30 0.27 0.26 0.24 0.23 0.22 0.21 0.19 0.18 0.17 0.16 0.16 0.16 0.15 0.15 0.14 0.14

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 42

Hydrograph for Link POA-3: Arlington High School

		•	•		· ·	•
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)
2.00	0.00	0.00	0.00	14.75	0.44	0.00
2.25	0.00	0.00	0.00	15.00	0.44	0.00
2.50	0.00	0.00	0.00	15.25	0.41	0.00
2.75	0.00	0.00	0.00	15.50	0.36	0.00
3.00	0.00	0.00	0.00	15.75	0.33	0.00
3.25	0.00	0.00	0.00	16.00	0.33	0.00
3.50	0.00	0.00	0.00	16.25	0.30	0.00
3.75	0.00	0.00	0.00	16.25	0.27	0.00
4.00	0.00	0.00	0.00	16.30	0.26	0.00
4.00	0.00	0.00	0.00	17.00	0.24	0.00
4.23	0.00	0.00	0.00	17.00	0.23	0.00
4.75 5.00	0.00 0.00	0.00 0.00	0.00	17.50 17.75	0.21 0.19	0.00 0.00
5.00			0.00			
5.25	0.00	0.00	0.00	18.00 18.25	0.18 0.17	0.00
5.50 5.75	0.00	0.00	0.00 0.00		0.17	0.00
6.00	0.00	0.00 0.00	0.00	18.50 18.75	0.16	0.00 0.00
6.25	0.00	0.00	0.00		0.16	0.00
	0.00	0.00	0.00	19.00 19.25		0.00
6.50 6.75	0.00	0.00	0.00	19.25	0.15 0.15	0.00
7.00	0.00	0.00	0.00	19.75	0.13	0.00
7.00 7.25	0.01	0.00	0.01		0.14	0.00
7.23 7.50	0.01	0.00	0.01	20.00	0.14	0.00
7.50 7.75	0.02					
8.00	0.03	0.00 0.00	0.03 0.04			
8.25	0.04	0.00	0.04			
8.50	0.05	0.00	0.05			
8.75	0.08	0.00	0.08			
9.00	0.08	0.00	0.08			
9.25	0.10	0.00	0.10			
9.50	0.12	0.00	0.12			
9.75	0.14	0.00	0.14			
10.00	0.17	0.00	0.17			
10.25	0.13	0.00	0.13			
10.50	0.27	0.00	0.27			
10.75	0.33	0.00	0.33			
11.00	0.38	0.00	0.38			
11.25	0.47	0.00	0.47			
11.50	0.64	0.00	0.64			
11.75	1.23	0.00	1.23			
12.00	3.14	0.00	3.14			
12.25	6.13	0.00	6.13			
12.50	3.01	0.00	3.01			
12.75	1.32	0.00	1.32			
13.00	0.93	0.00	0.93			
13.25	0.74	0.00	0.74			
13.50	0.67	0.00	0.67			
13.75	0.61	0.00	0.61			
14.00	0.55	0.00	0.55			
14.25	0.50	0.00	0.50			
14.50	0.47	0.00	0.47			

Existing Conditions - NOAA ++ Rainfall Type III 24-hr 50-Year Rainfall=7.42"

Prepared by Weston & Sampson

Printed 11/25/2020

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 43

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: DA-2 Runoff Area=165,210 sf 98.31% Impervious Runoff Depth>6.72"

Tc=6.0 min CN=97 Runoff=26.88 cfs 92,526 cf

SubcatchmentDA-2: DA-2 Runoff Area=14,062 sf 89.87% Impervious Runoff Depth>6.15"

Tc=6.0 min CN=92 Runoff=2.21 cfs 7,204 cf

SubcatchmentDA-3: DA-3 Runoff Area=82,167 sf 69.43% Impervious Runoff Depth>4.77"

Flow Length=337' Tc=13.3 min CN=80 Runoff=8.73 cfs 32,671 cf

Link POA-1: Mill Brook Inflow=26.88 cfs 92,526 cf

Primary=26.88 cfs 92,526 cf

Link POA-2: Grove Street Inflow=2.21 cfs 7,204 cf

Primary=2.21 cfs 7,204 cf

Link POA-3: Arlington High School Inflow=8.73 cfs 32,671 cf

Primary=8.73 cfs 32,671 cf

Total Runoff Area = 261,439 sf Runoff Volume = 132,401 cf Average Runoff Depth = 6.08" 11.22% Pervious = 29,333 sf 88.78% Impervious = 232,106 sf

Page 44

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

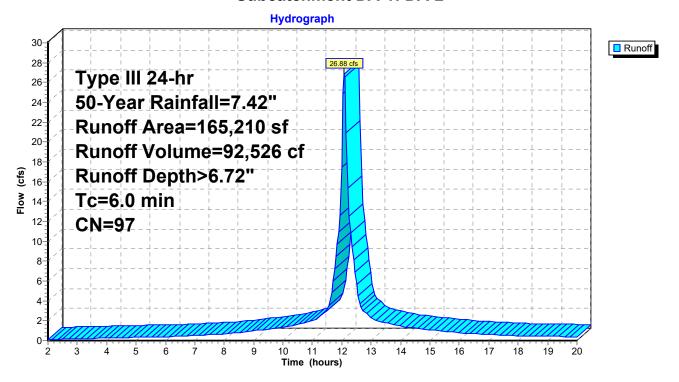
Summary for Subcatchment DA-1: DA-2

Runoff = 26.88 cfs @ 12.09 hrs, Volume= 92,526 cf, Depth> 6.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 50-Year Rainfall=7.42"

A	rea (sf)	CN Description							
	2,792	49	50-75% Grass cover, Fair, HSG A						
	162,418	98	Paved park	aved parking, HSG A					
•	165,210 97 Weighted Average								
	2,792		1.69% Pervious Area						
•	162,418		98.31% lmp	pervious Ar	rea				
Тс	9	Slope	,	Capacity	Description				
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
6.0					Direct Entry.				

Subcatchment DA-1: DA-2



Runoff (cfs) 1.17 1.09 1.01 0.93 0.85 0.77 0.71 0.68 0.64 0.61 0.57 0.54 0.50 0.47 0.45 0.44 0.43 0.41 0.40 0.39 0.38 0.37

14.50

6.19

5.83

1.25

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 45

Hydrograph for Subcatchment DA-1: DA-2

Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours) 2.00	(inches) 0.15	(inches) 0.02	(cfs) 0.10	(hours) 14.75	(inches) 6.27	(inches) 5.91
2.00	0.13	0.02	0.10	15.00	6.34	5.98
2.50	0.17	0.04	0.12	15.25	6.41	6.05
2.75	0.21	0.05	0.16	15.50	6.47	6.11
3.00	0.23	0.06	0.18	15.75	6.52	6.17
3.25	0.25	0.07	0.20	16.00	6.57	6.22
3.50	0.27	0.09	0.22	16.25	6.62	6.26
3.75	0.30	0.10	0.24	16.50	6.67	6.31
4.00	0.32	0.12	0.25	16.75	6.71	6.35
4.25 4.50	0.34 0.37	0.13 0.15	0.27 0.29	17.00 17.25	6.75 6.79	6.39 6.43
4.75	0.39	0.13	0.29	17.50	6.82	6.46
5.00	0.42	0.19	0.32	17.75	6.85	6.50
5.25	0.45	0.21	0.33	18.00	6.89	6.53
5.50	0.48	0.24	0.35	18.25	6.92	6.56
5.75	0.50	0.26	0.36	18.50	6.94	6.59
6.00	0.53	0.29	0.38	18.75	6.97	6.61
6.25	0.57	0.31	0.41	19.00	7.00 7.03	6.64
6.50 6.75	0.60 0.63	0.34 0.37	0.44 0.48	19.25 19.50	7.05	6.67 6.69
7.00	0.67	0.40	0.51	19.75	7.08	6.72
7.25	0.71	0.44	0.55	20.00	7.10	6.74
7.50	0.75	0.48	0.59			
7.75	0.80	0.52	0.63			
8.00	0.85	0.56	0.66			
8.25	0.90	0.61	0.73			
8.50 8.75	0.95 1.01	0.66	0.81 0.89			
9.00	1.08	0.72 0.78	0.89			
9.25	1.15	0.85	1.06			
9.50	1.23	0.92	1.14			
9.75	1.31	1.00	1.23			
10.00	1.40	1.09	1.31			
10.25	1.50	1.18	1.45			
10.50	1.61	1.29	1.62			
10.75 11.00	1.73 1.85	1.40 1.53	1.79 1.96			
11.25	2.01	1.68	2.43			
11.50	2.21	1.88	3.08			
11.75	2.64	2.30	7.21			
12.00	3.71	3.36	17.48			
12.25	4.78	4.43	12.56			
12.50	5.21	4.86	5.67			
12.75 13.00	5.41 5.56	5.05 5.21	2.96 2.31			
13.00	5.69	5.34	1.96			
13.50	5.81	5.46	1.79			
13.75	5.92	5.57	1.62			
14.00	6.02	5.66	1.45			
14.25	6.11	5.75	1.34			
14 50	6 10	5 93	1 25			

Page 46

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

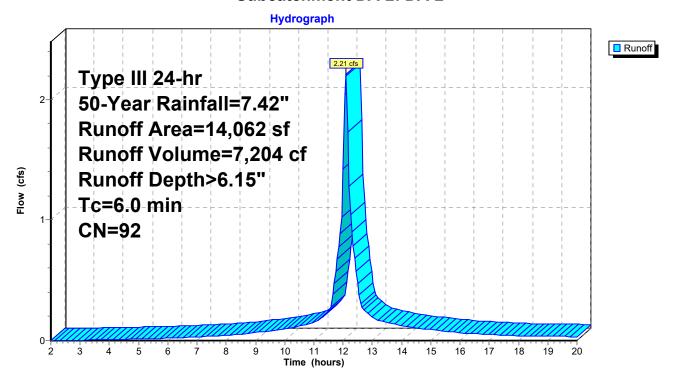
Summary for Subcatchment DA-2: DA-2

Runoff = 2.21 cfs @ 12.09 hrs, Volume= 7,204 cf, Depth> 6.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 50-Year Rainfall=7.42"

A	rea (sf)	a (sf) CN Description						
	1,425	25 39 >75% Grass cover, Good, HSG A						
	12,637	98	Paved parking, HSG A					
14,062 92 Weighted Average								
	1,425 10.13% Pervious				a			
	12,637 89.87% Impervious A			pervious Ar	rea			
т.	ما المحمد ا	Clana	Valacity	Conneitu	Description			
Tc	Length	Slope	,	Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
6.0					Direct Entry.			

Subcatchment DA-2: DA-2



Runoff (cfs) 0.10 0.09 80.0 0.08 0.07 0.06 0.06 0.06 0.05 0.05 0.05 0.05 0.04 0.04 0.04 0.04 0.04 0.03 0.03 0.03 0.03 0.03

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 47

Hydrograph for Subcatchment DA-2: DA-2

			, ,	-		
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00	0.15	0.00	0.00	14.75	6.27	5.33
2.25	0.17	0.00	0.00	15.00	6.34	5.40
2.50	0.19	0.00	0.00	15.25	6.41	5.47 5.53
2.75 3.00	0.21 0.23	0.00 0.00	0.00 0.00	15.50 15.75	6.47 6.52	5.58
3.25	0.25	0.00	0.00	16.00	6.57	5.63
3.50	0.23	0.01	0.00	16.25	6.62	5.68
3.75	0.30	0.01	0.01	16.50	6.67	5.73
4.00	0.32	0.02	0.01	16.75	6.71	5.77
4.25	0.34	0.03	0.01	17.00	6.75	5.81
4.50	0.37	0.04	0.01	17.25	6.79	5.84
4.75	0.39	0.04	0.01	17.50	6.82	5.88
5.00	0.42	0.05	0.01	17.75	6.85	5.91
5.25	0.45	0.07	0.01	18.00	6.89	5.94
5.50	0.48	0.08	0.02	18.25	6.92	5.97
5.75 6.00	0.50 0.53	0.09 0.11	0.02 0.02	18.50 18.75	6.94 6.97	6.00 6.03
6.25	0.57	0.11	0.02	19.00	7.00	6.05
6.50	0.60	0.14	0.02	19.25	7.03	6.08
6.75	0.63	0.16	0.03	19.50	7.05	6.11
7.00	0.67	0.18	0.03	19.75	7.08	6.13
7.25	0.71	0.21	0.03	20.00	7.10	6.15
7.50	0.75	0.23	0.04			
7.75	0.80	0.26	0.04			
8.00	0.85	0.29	0.04			
8.25	0.90	0.33	0.05			
8.50 8.75	0.95 1.01	0.37 0.41	0.05 0.06			
9.00	1.08	0.41	0.00			
9.25	1.15	0.52	0.07			
9.50	1.23	0.58	0.08			
9.75	1.31	0.65	0.09			
10.00	1.40	0.72	0.10			
10.25	1.50	0.80	0.11			
10.50	1.61	0.89	0.12			
10.75	1.73	0.99	0.14			
11.00	1.85 2.01	1.11	0.15 0.19			
11.25 11.50	2.01	1.25 1.43	0.19			
11.75	2.64	1.43	0.24			
12.00	3.71	2.84	1.42			
12.25	4.78	3.88	1.04			
12.50	5.21	4.29	0.47			
12.75	5.41	4.49	0.25			
13.00	5.56	4.64	0.19			
13.25	5.69	4.77	0.16			
13.50	5.81	4.89	0.15			
13.75 14.00	5.92 6.02	4.99 5.09	0.14 0.12			
14.00	6.11	5.09	0.12			
14.50	6.19	5.26	0.11			
17.00	0.10	0.20	0.11			

Page 48

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

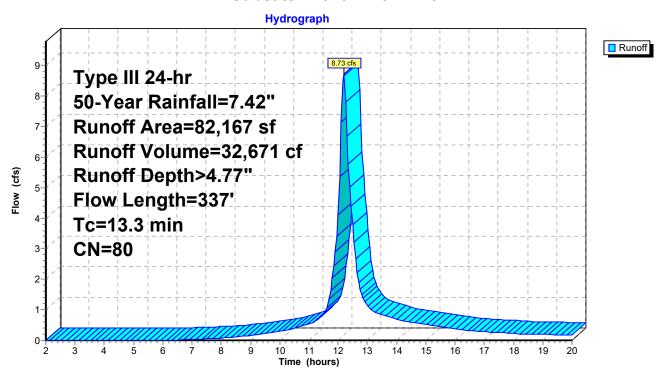
Summary for Subcatchment DA-3: DA-3

Runoff = 8.73 cfs @ 12.18 hrs, Volume= 32,671 cf, Depth> 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 50-Year Rainfall=7.42"

A	rea (sf)	CN E	Description					
	25,116 39 >75% Grass cover, Good, HSG A							
	57,051	98 F	Paved park	ing, HSG A				
	82,167	80 V	Veighted A	verage				
	25,116	3	0.57% Pei	rvious Area				
	57,051	6	9.43% Imp	pervious Ar	ea			
_				_				
Tc	Length	Slope	Velocity	Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
11.1	100	0.0150	0.15		Sheet Flow,			
					Grass: Short n= 0.150 P2= 3.12"			
1.8	112	0.0210	1.01		Shallow Concentrated Flow,			
					Short Grass Pasture Kv= 7.0 fps			
0.4	125	0.0080	5.27	4.14	•			
					12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'			
					n= 0.010 PVC, smooth interior			
13.3	337	Total						

Subcatchment DA-3: DA-3



Runoff (cfs) 0.55 0.51 0.48 0.44 0.40 0.37 0.33 0.32 0.30 0.29 0.27 0.25 0.24 0.22 0.21 0.20 0.20 0.19 0.19 0.18 0.18 0.17

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 49

Hydrograph for Subcatchment DA-3: DA-3

			, ,	-		
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00 2.25	0.15 0.17	0.00	0.00 0.00	14.75 15.00	6.27 6.34	4.02
2.23	0.17	0.00	0.00	15.00	6.41	4.09 4.15
2.75	0.19	0.00	0.00	15.25	6.47	4.13
3.00	0.21	0.00	0.00	15.75	6.52	4.21
3.25	0.25	0.00	0.00	16.00	6.57	4.20
3.50	0.27	0.00	0.00	16.25	6.62	4.35
3.75	0.30	0.00	0.00	16.50	6.67	4.39
4.00	0.32	0.00	0.00	16.75	6.71	4.43
4.25	0.34	0.00	0.00	17.00	6.75	4.46
4.50	0.37	0.00	0.00	17.25	6.79	4.50
4.75	0.39	0.00	0.00	17.50	6.82	4.53
5.00	0.42	0.00	0.00	17.75	6.85	4.56
5.25	0.45	0.00	0.00	18.00	6.89	4.59
5.50	0.48	0.00	0.00	18.25	6.92	4.62
5.75	0.50	0.00	0.00	18.50	6.94	4.64
6.00	0.53	0.00	0.00	18.75	6.97	4.67
6.25	0.57	0.00	0.01	19.00	7.00	4.69
6.50 6.75	0.60 0.63	0.00 0.01	0.01 0.02	19.25 19.50	7.03 7.05	4.72 4.74
7.00	0.67	0.01	0.02	19.30	7.03	4.74
7.00	0.07	0.01	0.03	20.00	7.10	4.79
7.50	0.75	0.02	0.05	20.00	7.10	4.75
7.75	0.80	0.03	0.06			
8.00	0.85	0.04	0.07			
8.25	0.90	0.05	0.09			
8.50	0.95	0.07	0.11			
8.75	1.01	0.09	0.13			
9.00	1.08	0.11	0.16			
9.25	1.15	0.14	0.19			
9.50	1.23	0.17	0.22			
9.75	1.31	0.20	0.25			
10.00	1.40	0.24	0.29			
10.25	1.50	0.29 0.34	0.33			
10.50 10.75	1.61 1.73	0.34	0.39 0.46			
11.00	1.75	0.48	0.40			
11.25	2.01	0.57	0.65			
11.50	2.21	0.70	0.88			
11.75	2.64	0.98	1.65			
12.00	3.71	1.80	4.10			
12.25	4.78	2.71	7.80			
12.50	5.21	3.08	3.78			
12.75	5.41	3.25	1.65			
13.00	5.56	3.39	1.16			
13.25	5.69	3.51	0.92			
13.50	5.81	3.61	0.83			
13.75	5.92	3.71	0.76			
14.00 14.25	6.02 6.11	3.80 3.88	0.69 0.62			
14.25	6.19	3.88	0.62			
14.50	0.19	ა.ყა	0.56			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 50

Summary for Link POA-1: Mill Brook

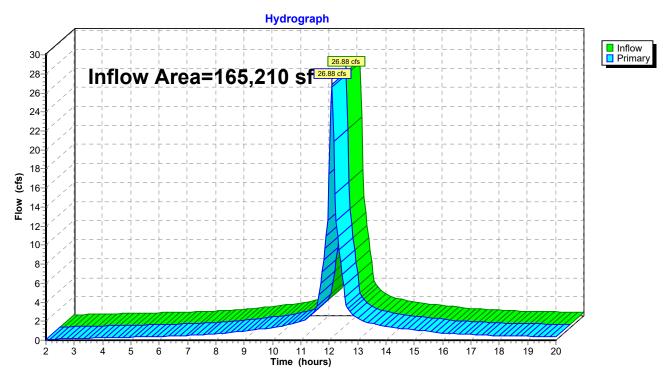
Inflow Area = 165,210 sf, 98.31% Impervious, Inflow Depth > 6.72" for 50-Year event

Inflow = 26.88 cfs @ 12.09 hrs, Volume= 92,526 cf

Primary = 26.88 cfs @ 12.09 hrs, Volume= 92,526 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-1: Mill Brook



Primary

(cfs)

1.17

1.09

1.01

0.93

0.85 0.77

0.71

0.68

0.64

0.61

0.57 0.54

0.50

0.47

0.45 0.44

0.43

0.41

0.40

0.39

0.38

0.37

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 51

Hydrograph for Link POA-1: Mill Brook

			,,			
Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.10	0.00	0.10	14.75	1.17	0.00
2.25	0.12	0.00	0.12	15.00	1.09	0.00
2.50	0.14	0.00	0.14	15.25	1.01	0.00
2.75	0.16	0.00	0.16	15.50	0.93	0.00
3.00	0.18	0.00	0.18	15.75	0.85	0.00
3.25	0.20	0.00	0.20	16.00	0.77	0.00
3.50	0.22	0.00	0.22	16.25	0.71	0.00
3.75	0.24	0.00	0.24	16.50	0.68	0.00
4.00	0.25	0.00	0.25	16.75	0.64	0.00
4.25	0.27	0.00	0.27	17.00	0.61	0.00
4.50	0.29	0.00	0.29	17.25	0.57	0.00
4.75	0.30	0.00	0.30	17.50	0.54	0.00
5.00	0.32	0.00	0.32	17.75	0.50	0.00
5.25 5.50	0.33 0.35	0.00 0.00	0.33 0.35	18.00 18.25	0.47 0.45	0.00 0.00
5.75	0.36	0.00	0.36	18.50	0.43	0.00
6.00	0.38	0.00	0.38	18.75	0.44	0.00
6.25	0.41	0.00	0.41	19.00	0.41	0.00
6.50	0.44	0.00	0.44	19.25	0.40	0.00
6.75	0.48	0.00	0.48	19.50	0.39	0.00
7.00	0.51	0.00	0.51	19.75	0.38	0.00
7.25	0.55	0.00	0.55	20.00	0.37	0.00
7.50	0.59	0.00	0.59			
7.75	0.63	0.00	0.63			
8.00	0.66	0.00	0.66			
8.25	0.73	0.00	0.73			
8.50	0.81	0.00	0.81			
8.75	0.89	0.00	0.89			
9.00	0.98	0.00	0.98			
9.25	1.06	0.00	1.06			
9.50	1.14	0.00	1.14			
9.75	1.23	0.00	1.23			
10.00	1.31	0.00	1.31			
10.25	1.45	0.00	1.45			
10.50 10.75	1.62 1.79	0.00 0.00	1.62 1.79			
11.00	1.79	0.00	1.79			
11.25	2.43	0.00	2.43			
11.50	3.08	0.00	3.08			
11.75	7.21	0.00	7.21			
12.00	17.48	0.00	17.48			
12.25	12.56	0.00	12.56			
12.50	5.67	0.00	5.67			
12.75	2.96	0.00	2.96			
13.00	2.31	0.00	2.31			
13.25	1.96	0.00	1.96			
13.50	1.79	0.00	1.79			
13.75	1.62	0.00	1.62			
14.00	1.45	0.00	1.45			
14.25	1.34	0.00	1.34			
14.50	1.25	0.00	1.25			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 52

Summary for Link POA-2: Grove Street

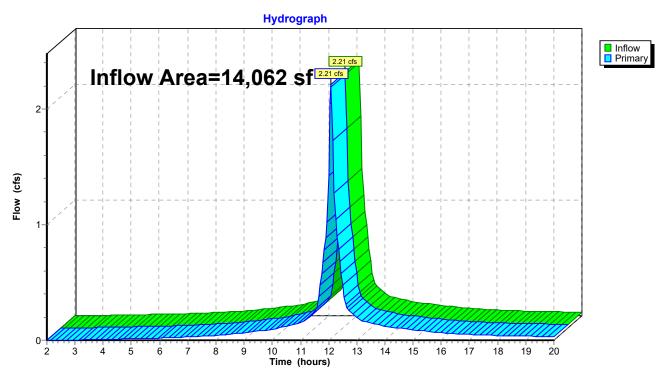
Inflow Area = 14,062 sf, 89.87% Impervious, Inflow Depth > 6.15" for 50-Year event

Inflow = 2.21 cfs @ 12.09 hrs, Volume= 7,204 cf

Primary = 2.21 cfs @ 12.09 hrs, Volume= 7,204 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-2: Grove Street



Primary (cfs) 0.10 0.09 0.08 0.08 0.07 0.06 0.06 0.06 0.05 0.05 0.05 0.05 0.04 0.04 0.04 0.04 0.04 0.03 0.03 0.03 0.03 0.03

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 53

Hydrograph for Link POA-2: Grove Street

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)
2.00	0.00	0.00	0.00	14.75	0.10	0.00
2.25	0.00	0.00	0.00	15.00	0.09	0.00
2.50	0.00	0.00	0.00	15.25	0.08	0.00
2.75	0.00	0.00	0.00	15.50	0.08	0.00
3.00	0.00	0.00	0.00	15.75	0.07	0.00
3.25	0.00	0.00	0.00	16.00	0.06	0.00
3.50	0.01	0.00	0.01	16.25	0.06	0.00
3.75	0.01	0.00	0.01	16.50	0.06	0.00
4.00	0.01	0.00	0.01	16.75	0.05	0.00
4.25	0.01	0.00	0.01	17.00	0.05	0.00
4.50	0.01	0.00	0.01	17.25	0.05	0.00
4.75	0.01	0.00	0.01	17.50	0.05	0.00
5.00	0.01	0.00	0.01	17.75	0.04	0.00
5.25	0.01	0.00	0.01	18.00	0.04	0.00
5.50	0.02 0.02	0.00	0.02	18.25	0.04	0.00
5.75		0.00	0.02	18.50	0.04 0.04	0.00 0.00
6.00 6.25	0.02 0.02	0.00 0.00	0.02 0.02	18.75 19.00	0.04	0.00
6.50	0.02	0.00	0.02	19.00	0.03	0.00
6.75	0.02	0.00	0.02	19.50	0.03	0.00
7.00	0.03	0.00	0.03	19.75	0.03	0.00
7.25	0.03	0.00	0.03	20.00	0.03	0.00
7.50	0.04	0.00	0.04		0.00	0.00
7.75	0.04	0.00	0.04			
8.00	0.04	0.00	0.04			
8.25	0.05	0.00	0.05			
8.50	0.05	0.00	0.05			
8.75	0.06	0.00	0.06			
9.00	0.07	0.00	0.07			
9.25	0.07	0.00	0.07			
9.50	0.08	0.00	0.08			
9.75	0.09	0.00	0.09			
10.00	0.10	0.00	0.10			
10.25	0.11	0.00	0.11			
10.50	0.12	0.00	0.12			
10.75 11.00	0.14 0.15	0.00 0.00	0.14 0.15			
11.00	0.15	0.00	0.13			
11.50	0.19	0.00	0.19			
11.75	0.57	0.00	0.24			
12.00	1.42	0.00	1.42			
12.25	1.04	0.00	1.04			
12.50	0.47	0.00	0.47			
12.75	0.25	0.00	0.25			
13.00	0.19	0.00	0.19			
13.25	0.16	0.00	0.16			
13.50	0.15	0.00	0.15			
13.75	0.14	0.00	0.14			
14.00	0.12	0.00	0.12			
14.25	0.11	0.00	0.11			
14.50	0.11	0.00	0.11			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 54

Summary for Link POA-3: Arlington High School

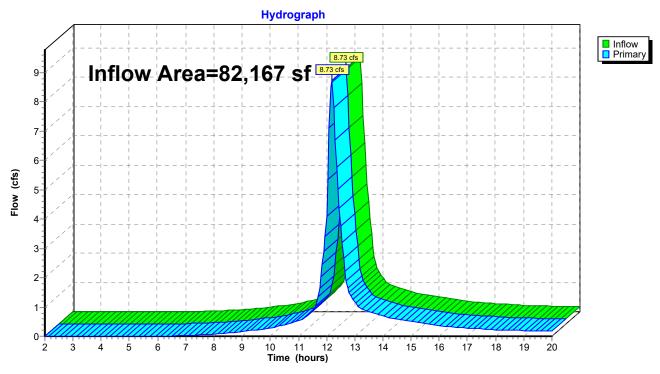
Inflow Area = 82,167 sf, 69.43% Impervious, Inflow Depth > 4.77" for 50-Year event

Inflow = 8.73 cfs @ 12.18 hrs, Volume= 32,671 cf

Primary = 8.73 cfs @ 12.18 hrs, Volume= 32,671 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-3: Arlington High School



Primary (cfs) 0.55 0.51 0.48 0.44 0.40 0.37 0.33 0.32 0.30 0.29 0.27 0.25 0.24 0.22 0.21 0.20 0.20 0.19 0.19 0.18 0.18 0.17

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 55

Hydrograph for Link POA-3: Arlington High School

		•	•		•	•
Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.00	0.00	0.00	14.75	0.55	0.00
2.25	0.00	0.00	0.00	15.00	0.51	0.00
2.50	0.00	0.00	0.00	15.25	0.48	0.00
2.75	0.00	0.00	0.00	15.50	0.44	0.00
3.00	0.00	0.00	0.00	15.75	0.40	0.00
3.25	0.00	0.00	0.00	16.00	0.37	0.00
3.50	0.00	0.00	0.00	16.25	0.33	0.00
3.75	0.00	0.00	0.00	16.50	0.32	0.00
4.00	0.00	0.00	0.00	16.75	0.30	0.00
4.25	0.00	0.00	0.00	17.00	0.29	0.00
4.50	0.00	0.00	0.00	17.25	0.27	0.00
4.75	0.00	0.00	0.00	17.50	0.25	0.00
5.00	0.00	0.00	0.00	17.75	0.24	0.00
5.25	0.00	0.00	0.00	18.00	0.22	0.00
5.50	0.00	0.00	0.00	18.25	0.21	0.00
5.75	0.00	0.00	0.00	18.50	0.20	0.00
6.00	0.00	0.00	0.00	18.75	0.20	0.00
6.25	0.01	0.00	0.01	19.00	0.19	0.00
6.50	0.01	0.00	0.01	19.25	0.19	0.00
6.75	0.02	0.00	0.02	19.50	0.18	0.00
7.00	0.03	0.00	0.03	19.75	0.18	0.00
7.25	0.04	0.00	0.04	20.00	0.17	0.00
7.50	0.05	0.00	0.05			
7.75	0.06	0.00	0.06			
8.00	0.07	0.00	0.07			
8.25	0.09	0.00	0.09			
8.50	0.11	0.00	0.11			
8.75	0.13	0.00	0.13			
9.00	0.16	0.00	0.16			
9.25	0.19	0.00	0.19			
9.50	0.22	0.00	0.22			
9.75	0.25	0.00	0.25			
10.00	0.29	0.00	0.29			
10.25	0.33	0.00	0.33			
10.50 10.75	0.39 0.46	0.00 0.00	0.39 0.46			
11.00	0.40	0.00	0.40			
11.00	0.55	0.00	0.55			
11.25	0.88		0.88			
11.75	1.65	0.00 0.00	1.65			
12.00	4.10	0.00	4.10			
12.00	7.80	0.00	7.80			
12.50	3.78	0.00	3.78			
12.75	1.65	0.00	1.65			
13.00	1.16	0.00	1.16			
13.25	0.92	0.00	0.92			
13.50	0.83	0.00	0.83			
13.75	0.76	0.00	0.76			
14.00	0.69	0.00	0.69			
14.25	0.62	0.00	0.62			
14.50	0.58	0.00	0.58			
	0.00	0.00	0.00			

Existing Conditions - NOAA ++ Rainfall Type III 24-hr 100-Year Rainfall=8.89" Printed 11/25/2020

Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 56

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-1: DA-2 Runoff Area=165,210 sf 98.31% Impervious Runoff Depth>8.11"

Tc=6.0 min CN=97 Runoff=32.26 cfs 111,693 cf

SubcatchmentDA-2: DA-2 Runoff Area=14,062 sf 89.87% Impervious Runoff Depth>7.54"

Tc=6.0 min CN=92 Runoff=2.68 cfs 8,834 cf

SubcatchmentDA-3: DA-3 Runoff Area=82,167 sf 69.43% Impervious Runoff Depth>6.08"

Flow Length=337' Tc=13.3 min CN=80 Runoff=11.01 cfs 41,649 cf

Link POA-1: Mill Brook Inflow=32.26 cfs 111,693 cf

Primary=32.26 cfs 111,693 cf

Link POA-2: Grove Street Inflow=2.68 cfs 8,834 cf

Primary=2.68 cfs 8,834 cf

Link POA-3: Arlington High School Inflow=11.01 cfs 41,649 cf

Primary=11.01 cfs 41,649 cf

Total Runoff Area = 261,439 sf Runoff Volume = 162,176 cf Average Runoff Depth = 7.44" 11.22% Pervious = 29,333 sf 88.78% Impervious = 232,106 sf HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 57

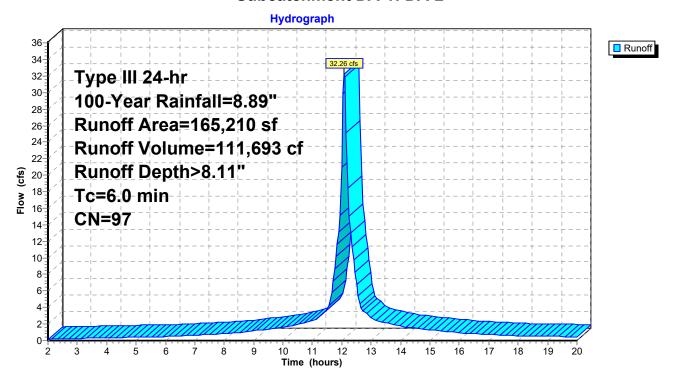
Summary for Subcatchment DA-1: DA-2

Runoff = 32.26 cfs @ 12.09 hrs, Volume= 111,693 cf, Depth> 8.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.89"

 Aı	rea (sf)	CN Description						
	2,792	49	9 50-75% Grass cover, Fair, HSG A					
 1	62,418	98	Paved park	aved parking, HSG A				
165,210 97 Weighted Average				verage				
2,792			1.69% Pervious Area					
162,418			98.31% Impervious Area					
Тс	Length	Slope	e Velocity	Capacity	Description			
in)	(feet)	(ft/ft	,	(cfs)	Beschption			
 3.0	(,	(1211	()	(3.3)	Direct Entry.			

Subcatchment DA-1: DA-2



Runoff (cfs) 1.41 1.31 1.21 1.11 1.02 0.92 0.86 0.81 0.77 0.73 0.69 0.64 0.60 0.56 0.54 0.52 0.51 0.50 0.48 0.47 0.46 0.45 Page 58

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Hydrograph for Subcatchment DA-1: DA-2

			,			
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00	0.18	0.03	0.15	14.75	7.51	7.15
2.25	0.20	0.04	0.18	15.00	7.59	7.24
2.50	0.22	0.06	0.20	15.25	7.67	7.32
2.75	0.25	0.07	0.22	15.50	7.75	7.39
3.00	0.27	0.09	0.24	15.75	7.82	7.46
3.25	0.30	0.10	0.27	16.00	7.88	7.52
3.50	0.33	0.12	0.29	16.25	7.93	7.57
3.75	0.35	0.14	0.31	16.50	7.99	7.63
4.00	0.38	0.16	0.33	16.75	8.04	7.68
4.25	0.41	0.19	0.35	17.00	8.09	7.73
4.50	0.44	0.21	0.37	17.25	8.13	7.77
4.75	0.47	0.23	0.38	17.50	8.17	7.81
5.00	0.50	0.26	0.40	17.75	8.21	7.85
5.25	0.54	0.29	0.42	18.00	8.25	7.89
5.50	0.57	0.32	0.44	18.25	8.29	7.93
5.75	0.60	0.35	0.46	18.50	8.32	7.96
6.00	0.64	0.38	0.47	18.75	8.35	7.99
6.25	0.68	0.41	0.50	19.00	8.39	8.03
6.50	0.72	0.44	0.55	19.25	8.42	8.06
6.75	0.76	0.48	0.59	19.50	8.45	8.09
7.00	0.80	0.52	0.64	19.75	8.48	8.12
7.25	0.85	0.57	0.68	20.00	8.51	8.15
7.50	0.90	0.62	0.72			
7.75 8.00	0.96 1.01	0.67 0.72	0.77			
8.25	1.07	0.72	0.81 0.89			
8.50	1.07	0.78	0.89			
8.75	1.14	0.04	1.09			
9.00	1.30	0.99	1.19			
9.25	1.38	1.07	1.29			
9.50	1.48	1.16	1.39			
9.75	1.57	1.26	1.49			
10.00	1.68	1.36	1.59			
10.25	1.80	1.47	1.75			
10.50	1.92	1.60	1.96			
10.75	2.07	1.74	2.16			
11.00	2.22	1.89	2.37			
11.25	2.41	2.08	2.93			
11.50	2.65	2.31	3.71			
11.75	3.16	2.82	8.67			
12.00	4.44	4.09	20.99			
12.25	5.73	5.38	15.06			
12.50	6.24	5.88	6.80			
12.75	6.48	6.12	3.55			
13.00	6.67	6.31	2.77			
13.25	6.82	6.47	2.35			
13.50	6.97	6.61 6.74	2.15			
13.75 14.00	7.09 7.21	6.74 6.85	1.94 1.74			
14.00	7.21	6.96	1.74			
14.25	7.32 7.41	7.06	1.50			
14.50	7.41	7.00	1.50			

Page 59

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

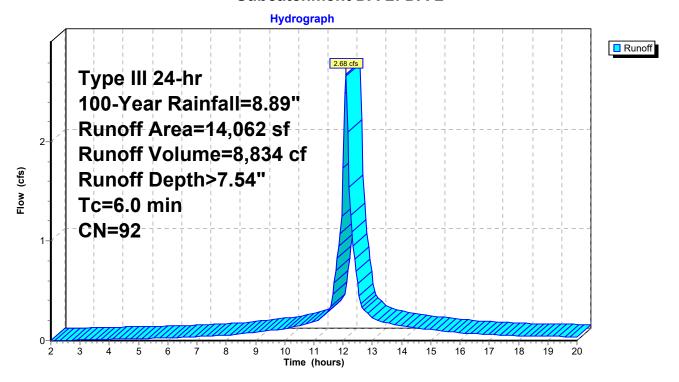
Summary for Subcatchment DA-2: DA-2

Runoff = 2.68 cfs @ 12.09 hrs, Volume= 8,834 cf, Depth> 7.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.89"

A	rea (sf)	a (sf) CN Description						
	1,425	25 39 >75% Grass cover, Good, HSG A						
	12,637	98	Paved parking, HSG A					
14,062 92 Weighted Average								
	1,425 10.13% Pervious				a			
	12,637 89.87% Impervious A			pervious Ar	rea			
т.	ما المحمد ا	Clana	Valacity	Conneitu	Description			
Tc	Length	Slope	,	Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
6.0					Direct Entry.			

Subcatchment DA-2: DA-2



Runoff (cfs) 0.12 0.11 0.10 0.09 0.09 80.0 0.07 0.07 0.07 0.06 0.06 0.05 0.05 0.05 0.05 0.04 0.04 0.04 0.04 0.04 0.04 0.04

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 60

Hydrograph for Subcatchment DA-2: DA-2

			, ,	•		
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)
2.00	0.18	0.00	0.00	14.75	7.51	6.56
2.25	0.20	0.00	0.00	15.00	7.59	6.64
2.50	0.22	0.00	0.00	15.25	7.67	6.72
2.75	0.25	0.01	0.00	15.50	7.75	6.79
3.00	0.27	0.01	0.01	15.75	7.82	6.86
3.25	0.30	0.02	0.01	16.00	7.88	6.92
3.50	0.33	0.02	0.01	16.25	7.93	6.98
3.75	0.35	0.03	0.01	16.50	7.99	7.03
4.00	0.38	0.04	0.01	16.75	8.04	7.08
4.25	0.41	0.05	0.01	17.00	8.09	7.13
4.50 4.75	0.44 0.47	0.06 0.08	0.02 0.02	17.25	8.13 8.17	7.17 7.22
5.00	0.47	0.08	0.02	17.50 17.75	8.21	7.25
5.25	0.54	0.03	0.02	18.00	8.25	7.29
5.50	0.57	0.12	0.02	18.25	8.29	7.33
5.75	0.60	0.14	0.02	18.50	8.32	7.36
6.00	0.64	0.16	0.03	18.75	8.35	7.39
6.25	0.68	0.18	0.03	19.00	8.39	7.43
6.50	0.72	0.21	0.03	19.25	8.42	7.46
6.75	0.76	0.24	0.04	19.50	8.45	7.49
7.00	0.80	0.27	0.04	19.75	8.48	7.52
7.25 7.50	0.85	0.30	0.04	20.00	8.51	7.55
7.50 7.75	0.90 0.96	0.33 0.37	0.05 0.05			
8.00	1.01	0.37	0.05			
8.25	1.07	0.46	0.06			
8.50	1.14	0.51	0.07			
8.75	1.22	0.57	0.08			
9.00	1.30	0.63	0.08			
9.25	1.38	0.70	0.09			
9.50	1.48	0.78	0.10			
9.75	1.57	0.86	0.11			
10.00 10.25	1.68 1.80	0.95 1.06	0.12 0.13			
10.23	1.92	1.00	0.15			
10.75	2.07	1.30	0.17			
11.00	2.22	1.44	0.19			
11.25	2.41	1.61	0.23			
11.50	2.65	1.83	0.30			
11.75	3.16	2.31	0.70			
12.00	4.44	3.55	1.73			
12.25	5.73	4.81	1.26			
12.50	6.24	5.31	0.57			
12.75 13.00	6.48 6.67	5.54 5.73	0.30 0.23			
13.00	6.82	5.73	0.23			
13.50	6.97	6.02	0.20			
13.75	7.09	6.15	0.16			
14.00	7.21	6.26	0.15			
14.25	7.32	6.37	0.13			
14.50	7.41	6.46	0.13			
				•		

Page 61

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

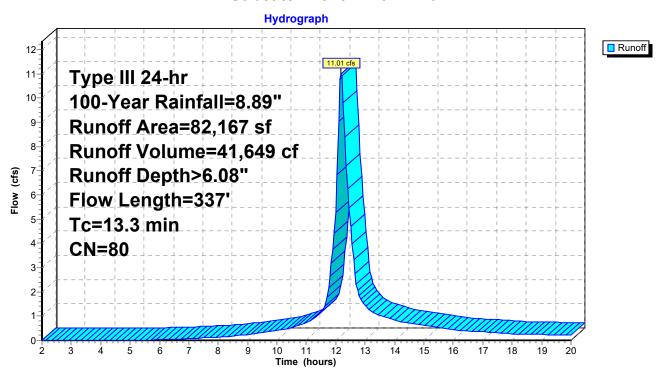
Summary for Subcatchment DA-3: DA-3

Runoff = 11.01 cfs @ 12.18 hrs, Volume= 41,649 cf, Depth> 6.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.89"

_	Α	rea (sf)	CN I	Description						
	25,116 39 >75% Grass cover, Good, HSG A									
	57,051 98 Paved parking, HSG A									
		82,167	۷ 08	Neighted A	verage					
		25,116	;	30.57% Pe	rvious Area					
		57,051	(59.43% Imp	pervious Ar	ea				
	Tc	Length	Slope	•	Capacity	Description				
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	11.1	100	0.0150	0.15		Sheet Flow,				
						Grass: Short n= 0.150 P2= 3.12"				
	1.8	112	0.0210	1.01		Shallow Concentrated Flow,				
						Short Grass Pasture Kv= 7.0 fps				
	0.4	125	0.0080	5.27	4.14	· · · · · · · · · · · · · · · · · · ·				
						12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25'				
_						n= 0.010 PVC, smooth interior				
	13.3	337	Total							

Subcatchment DA-3: DA-3



Runoff

(cfs)

0.67 0.63 0.58

0.54

0.49

0.45

0.41 0.39

0.37

0.35

0.33

0.31 0.29

0.27

0.25

0.25

0.24

0.24

0.23

0.22

0.22

0.21

Page 62

Arlington-EX - NOAA 14++

14.50

7.41

5.08

0.72

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Hydrograph for Subcatchment DA-3: DA-3

			nyarog	iupii ioi	Cabcat	
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00	0.18	0.00	0.00	14.75	7.51	5.17 5.25
2.25 2.50	0.20 0.22	0.00	0.00 0.00	15.00 15.25	7.59 7.67	5.25
2.75	0.25	0.00	0.00	15.50	7.75	5.39
3.00	0.27	0.00	0.00	15.75	7.82	5.45
3.25	0.30	0.00	0.00	16.00	7.88	5.51
3.50	0.33	0.00	0.00	16.25	7.93	5.56
3.75	0.35	0.00	0.00	16.50	7.99	5.61
4.00 4.25	0.38 0.41	0.00	0.00 0.00	16.75 17.00	8.04 8.09	5.66 5.71
4.50	0.41	0.00	0.00	17.25	8.13	5.75
4.75	0.47	0.00	0.00	17.50	8.17	5.79
5.00	0.50	0.00	0.00	17.75	8.21	5.82
5.25	0.54	0.00	0.00	18.00	8.25	5.86
5.50	0.57 0.60	0.00	0.01 0.02	18.25 18.50	8.29	5.89
5.75 6.00	0.64	0.00	0.02	18.75	8.32 8.35	5.93 5.96
6.25	0.68	0.01	0.03	19.00	8.39	5.99
6.50	0.72	0.02	0.04	19.25	8.42	6.02
6.75	0.76	0.02	0.05	19.50	8.45	6.05
7.00	0.80	0.03	0.06	19.75	8.48	6.07
7.25 7.50	0.85 0.90	0.04 0.06	0.08 0.09	20.00	8.51	6.10
7.75	0.96	0.00	0.11			
8.00	1.01	0.09	0.12			
8.25	1.07	0.11	0.14			
8.50	1.14	0.13	0.17			
8.75 9.00	1.22 1.30	0.16 0.19	0.20 0.24			
9.25	1.38	0.13	0.28			
9.50	1.48	0.27	0.32			
9.75	1.57	0.32	0.36			
10.00	1.68	0.38	0.41			
10.25 10.50	1.80 1.92	0.44 0.52	0.46 0.54			
10.30	2.07	0.52	0.63			
11.00	2.22	0.70	0.72			
11.25	2.41	0.83	0.87			
11.50	2.65	0.99	1.16			
11.75	3.16	1.37	2.16			
12.00 12.25	4.44 5.73	2.41 3.54	5.27 9.79			
12.50	6.24	4.00	4.69			
12.75	6.48	4.22	2.04			
13.00	6.67	4.39	1.43			
13.25	6.82	4.53	1.14			
13.50 13.75	6.97 7.09	4.66 4.78	1.03 0.93			
14.00	7.09	4.78	0.93			
14.25	7.32	4.99	0.76			
44.50	7 44	- 00	0.70	I		

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 63

Summary for Link POA-1: Mill Brook

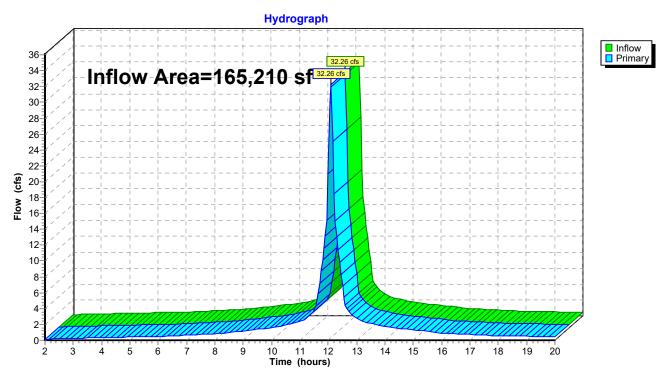
Inflow Area = 165,210 sf, 98.31% Impervious, Inflow Depth > 8.11" for 100-Year event

Inflow = 32.26 cfs @ 12.09 hrs, Volume= 111,693 cf

Primary = 32.26 cfs @ 12.09 hrs, Volume= 111,693 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-1: Mill Brook



Primary

(cfs)

1.41

1.31

1.21

1.11

1.02

0.92

0.86

0.81

0.77

0.73

0.69

0.64

0.60

0.56

0.54

0.52

0.51

0.50

0.48

0.47 0.46

0.45

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 64

Hydrograph for Link POA-1: Mill Brook

			,			
Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.15	0.00	0.15	14.75	1.41	0.00
2.25	0.18	0.00	0.18	15.00	1.31	0.00
2.50	0.20	0.00	0.20	15.25	1.21	0.00
2.75	0.22	0.00	0.22	15.50	1.11	0.00
3.00	0.24	0.00	0.24	15.75	1.02	0.00
3.25	0.27	0.00	0.27	16.00	0.92	0.00
3.50	0.29	0.00	0.29	16.25	0.86	0.00
3.75	0.31	0.00	0.31	16.50	0.81	0.00
4.00	0.33	0.00	0.33	16.75	0.77	0.00
4.25	0.35	0.00	0.35	17.00	0.73	0.00
4.50	0.37	0.00	0.37	17.25	0.69	0.00
4.75	0.38	0.00	0.38	17.50	0.64	0.00
5.00	0.40	0.00	0.40	17.75	0.60	0.00
5.25	0.42	0.00	0.42	18.00	0.56	0.00
5.50 5.75	0.44 0.46	0.00 0.00	0.44 0.46	18.25 18.50	0.54 0.52	0.00 0.00
6.00	0.40	0.00	0.40	18.75	0.52	0.00
6.25	0.50	0.00	0.50	19.00	0.50	0.00
6.50	0.55	0.00	0.55	19.25	0.48	0.00
6.75	0.59	0.00	0.59	19.50	0.47	0.00
7.00	0.64	0.00	0.64	19.75	0.46	0.00
7.25	0.68	0.00	0.68	20.00	0.45	0.00
7.50	0.72	0.00	0.72		00	0.00
7.75	0.77	0.00	0.77			
8.00	0.81	0.00	0.81			
8.25	0.89	0.00	0.89			
8.50	0.99	0.00	0.99			
8.75	1.09	0.00	1.09			
9.00	1.19	0.00	1.19			
9.25	1.29	0.00	1.29			
9.50	1.39	0.00	1.39			
9.75	1.49	0.00	1.49			
10.00	1.59	0.00	1.59			
10.25	1.75	0.00	1.75			
10.50	1.96	0.00	1.96			
10.75	2.16	0.00	2.16			
11.00	2.37	0.00	2.37			
11.25	2.93 3.71	0.00 0.00	2.93 3.71			
11.50 11.75	8.67	0.00	3.71 8.67			
12.00	20.99	0.00	20.99			
12.25	15.06	0.00	15.06			
12.50	6.80	0.00	6.80			
12.75	3.55	0.00	3.55			
13.00	2.77	0.00	2.77			
13.25	2.35	0.00	2.35			
13.50	2.15	0.00	2.15			
13.75	1.94	0.00	1.94			
14.00	1.74	0.00	1.74			
14.25	1.60	0.00	1.60			
14.50	1.50	0.00	1.50			

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 65

Summary for Link POA-2: Grove Street

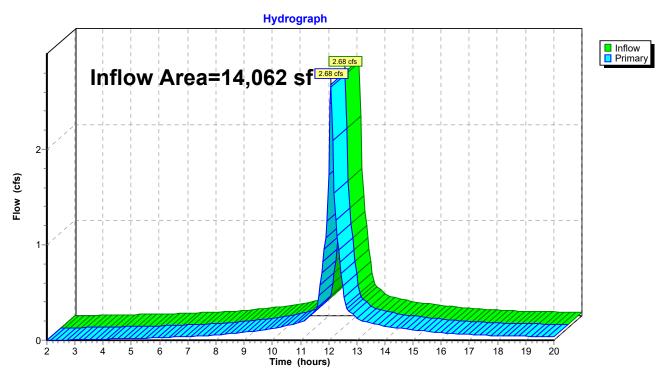
Inflow Area = 14,062 sf, 89.87% Impervious, Inflow Depth > 7.54" for 100-Year event

Inflow = 2.68 cfs @ 12.09 hrs, Volume= 8,834 cf

Primary = 2.68 cfs @ 12.09 hrs, Volume= 8,834 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-2: Grove Street



Primary (cfs) 0.12 0.11 0.10 0.09 0.09 0.08 0.07 0.07 0.07 0.06 0.06 0.05 0.05 0.05 0.05 0.04 0.04 0.04 0.04 0.04 0.04 0.04 Page 66

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Hydrograph for Link POA-2: Grove Street

Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.00	0.00	0.00	14.75	0.12	0.00
2.25	0.00	0.00	0.00	15.00	0.11	0.00
2.50	0.00	0.00	0.00	15.25	0.10	0.00
2.75	0.00	0.00	0.00	15.50	0.09	0.00
3.00	0.01	0.00	0.01	15.75	0.09	0.00
3.25	0.01 0.01	0.00 0.00	0.01 0.01	16.00	0.08	0.00
3.50 3.75	0.01	0.00	0.01	16.25 16.50	0.07 0.07	0.00 0.00
4.00	0.01	0.00	0.01	16.75	0.07	0.00
4.25	0.01	0.00	0.01	17.00	0.06	0.00
4.50	0.02	0.00	0.02	17.25	0.06	0.00
4.75	0.02	0.00	0.02	17.50	0.05	0.00
5.00	0.02	0.00	0.02	17.75	0.05	0.00
5.25	0.02	0.00	0.02	18.00	0.05	0.00
5.50	0.02	0.00	0.02	18.25	0.05	0.00
5.75	0.02	0.00	0.02	18.50	0.04	0.00
6.00	0.03	0.00	0.03	18.75	0.04	0.00
6.25	0.03	0.00	0.03	19.00	0.04	0.00
6.50	0.03	0.00	0.03	19.25	0.04	0.00
6.75	0.04	0.00	0.04	19.50	0.04	0.00
7.00	0.04	0.00	0.04	19.75	0.04	0.00
7.25 7.50	0.04 0.05	0.00 0.00	0.04 0.05	20.00	0.04	0.00
7.30 7.75	0.05	0.00	0.05			
8.00	0.05	0.00	0.05			
8.25	0.06	0.00	0.06			
8.50	0.07	0.00	0.07			
8.75	0.08	0.00	0.08			
9.00	0.08	0.00	0.08			
9.25	0.09	0.00	0.09			
9.50	0.10	0.00	0.10			
9.75	0.11	0.00	0.11			
10.00	0.12	0.00	0.12			
10.25	0.13	0.00	0.13			
10.50	0.15	0.00	0.15			
10.75	0.17	0.00	0.17			
11.00 11.25	0.19 0.23	0.00 0.00	0.19 0.23			
11.50	0.23	0.00	0.23			
11.75	0.70	0.00	0.70			
12.00	1.73	0.00	1.73			
12.25	1.26	0.00	1.26			
12.50	0.57	0.00	0.57			
12.75	0.30	0.00	0.30			
13.00	0.23	0.00	0.23			
13.25	0.20	0.00	0.20			
13.50	0.18	0.00	0.18			
13.75	0.16	0.00	0.16			
14.00	0.15	0.00	0.15			
14.25	0.13	0.00	0.13			
14.50	0.13	0.00	0.13			

Arlington-EX - NOAA 14++

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 67

Summary for Link POA-3: Arlington High School

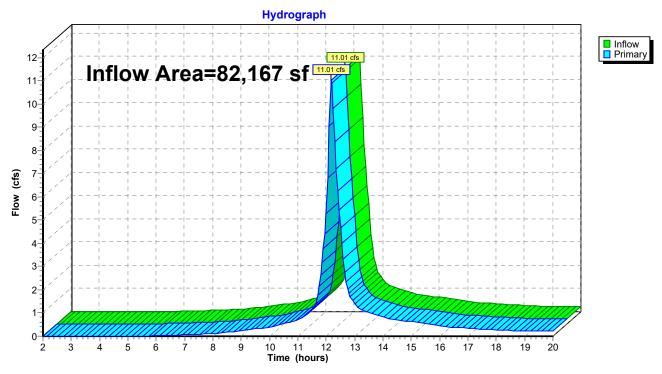
Inflow Area = 82,167 sf, 69.43% Impervious, Inflow Depth > 6.08" for 100-Year event

Inflow = 11.01 cfs @ 12.18 hrs, Volume= 41,649 cf

Primary = 11.01 cfs @ 12.18 hrs, Volume= 41,649 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-3: Arlington High School



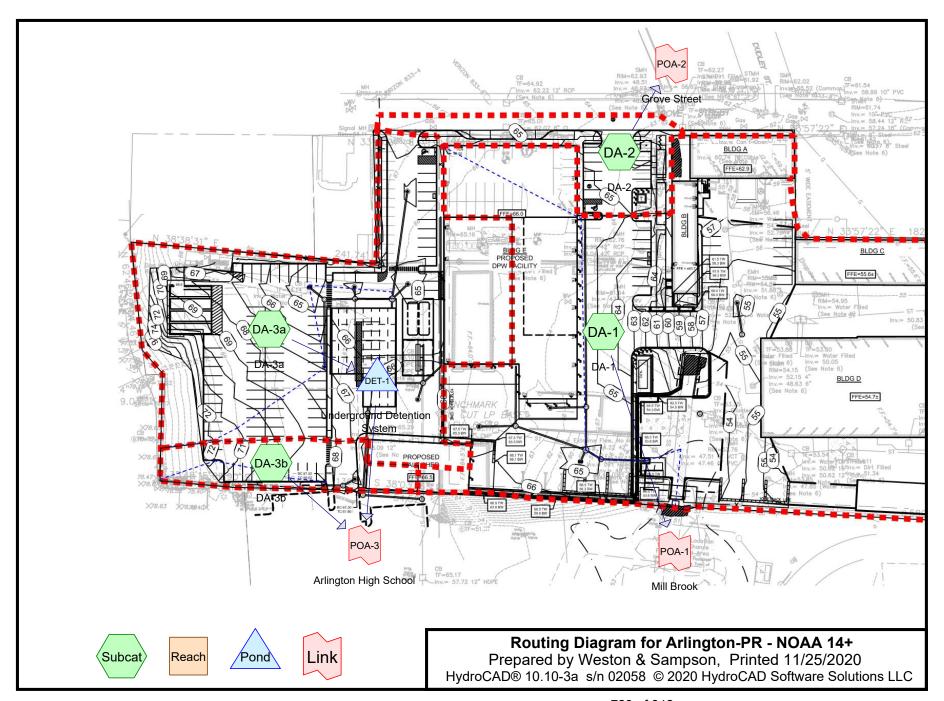
Primary (cfs) 0.67 0.63 0.58 0.54 0.49 0.45 0.41 0.39 0.37 0.35 0.33 0.31 0.29 0.27 0.25 0.25 0.24 0.24 0.23 0.22 0.22 0.21

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 68

Hydrograph for Link POA-3: Arlington High School

		-	•		•	•
Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.00	0.00	0.00	14.75	0.67	0.00
2.25	0.00	0.00	0.00	15.00	0.63	0.00
2.50	0.00	0.00	0.00	15.25	0.58	0.00
2.75	0.00	0.00	0.00	15.50	0.54	0.00
3.00	0.00	0.00	0.00	15.75	0.49	0.00
3.25	0.00	0.00	0.00	16.00	0.45	0.00
3.50	0.00	0.00	0.00	16.25	0.41	0.00
3.75	0.00	0.00	0.00	16.50	0.39	0.00
4.00	0.00	0.00	0.00	16.75	0.37	0.00 0.00
4.25 4.50	0.00	0.00 0.00	0.00 0.00	17.00 17.25	0.35 0.33	0.00
4.75	0.00	0.00	0.00	17.23	0.33	0.00
5.00	0.00	0.00	0.00	17.30	0.31	0.00
5.25	0.00	0.00	0.00	18.00	0.29	0.00
5.50	0.00	0.00	0.00	18.25	0.27	0.00
5.75	0.01	0.00	0.01	18.50	0.25	0.00
6.00	0.02	0.00	0.02	18.75	0.24	0.00
6.25	0.03	0.00	0.03	19.00	0.24	0.00
6.50	0.04	0.00	0.04	19.25	0.23	0.00
6.75	0.05	0.00	0.05	19.50	0.22	0.00
7.00	0.06	0.00	0.06	19.75	0.22	0.00
7.25	0.08	0.00	0.08	20.00	0.21	0.00
7.50	0.09	0.00	0.09			
7.75	0.11	0.00	0.11			
8.00	0.12	0.00	0.12			
8.25	0.14	0.00	0.14			
8.50	0.17	0.00	0.17			
8.75	0.20	0.00	0.20			
9.00	0.24	0.00	0.24			
9.25	0.28	0.00	0.28			
9.50	0.32	0.00	0.32			
9.75	0.36	0.00	0.36			
10.00	0.41	0.00	0.41			
10.25	0.46	0.00	0.46			
10.50	0.54	0.00	0.54			
10.75 11.00	0.63 0.72	0.00 0.00	0.63 0.72			
11.25	0.72	0.00	0.72			
11.50	1.16	0.00	1.16			
11.75	2.16	0.00	2.16			
12.00	5.27	0.00	5.27			
12.25	9.79	0.00	9.79			
12.50	4.69	0.00	4.69			
12.75	2.04	0.00	2.04			
13.00	1.43	0.00	1.43			
13.25	1.14	0.00	1.14			
13.50	1.03	0.00	1.03			
13.75	0.93	0.00	0.93			
14.00	0.84	0.00	0.84			
14.25	0.76	0.00	0.76			
14.50	0.72	0.00	0.72			



Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Printed 11/25/2020

Page 2

Area Listing (all nodes)

Are	a CN	Description
(sq-ff	t)	(subcatchment-numbers)
24,16	9 39	>75% Grass cover, Good, HSG A (DA-1, DA-2, DA-3a, DA-3b)
237,27	0 98	Paved parking, HSG A (DA-1, DA-2, DA-3a, DA-3b)
261,43	9 93	TOTAL AREA

Arlington-PR - NOAA 14+
Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Printed 11/25/2020

Page 3

Soil Listing (all nodes)

Area	Soil	Subcatchment
(sq-ft)	Group	Numbers
261,439	HSG A	DA-1, DA-2, DA-3a, DA-3b
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
261,439		TOTAL AREA

Printed 11/25/2020

Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 4

Su Nυ

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
24,169	0	0	0	0	24,169	>75% Grass
						cover, Good
237,270	0	0	0	0	237,270	Paved parking
261,439	0	0	0	0	261,439	TOTAL AREA

Proposed Conditions - NOAA ++ Rainfall Type III 24-hr 2-Year Rainfall=3.63" Printed 11/25/2020

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 5

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: DA-1 Runoff Area=164,858 sf 94.89% Impervious Runoff Depth>2.91"

Tc=6.0 min CN=95 Runoff=12.46 cfs 39,982 cf

SubcatchmentDA-2: DA-2 Runoff Area=14,034 sf 87.20% Impervious Runoff Depth>2.42"

Tc=6.0 min CN=90 Runoff=0.93 cfs 2,831 cf

SubcatchmentDA-3a: DA-3a Runoff Area=72,161 sf 84.29% Impervious Runoff Depth>2.33"

Tc=6.0 min CN=89 Runoff=4.65 cfs 14,012 cf

SubcatchmentDA-3b: DA-3b Runoff Area=10,386 sf 74.79% Impervious Runoff Depth>1.83"

Tc=6.0 min CN=83 Runoff=0.54 cfs 1,587 cf

Pond DET-1: Underground Detention Peak Elev=61.65' Storage=4,495 cf Inflow=4.65 cfs 14,012 cf

Outflow=1.70 cfs 13,341 cf

Link POA-1: Mill Brook Inflow=12.46 cfs 39,982 cf

Primary=12.46 cfs 39,982 cf

Link POA-2: Grove Street Inflow=0.93 cfs 2,831 cf

Primary=0.93 cfs 2,831 cf

Link POA-3: Arlington High School Inflow=1.99 cfs 14,929 cf

Primary=1.99 cfs 14,929 cf

Total Runoff Area = 261,439 sf Runoff Volume = 58,412 cf Average Runoff Depth = 2.68" 9.24% Pervious = 24,169 sf 90.76% Impervious = 237,270 sf

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 6

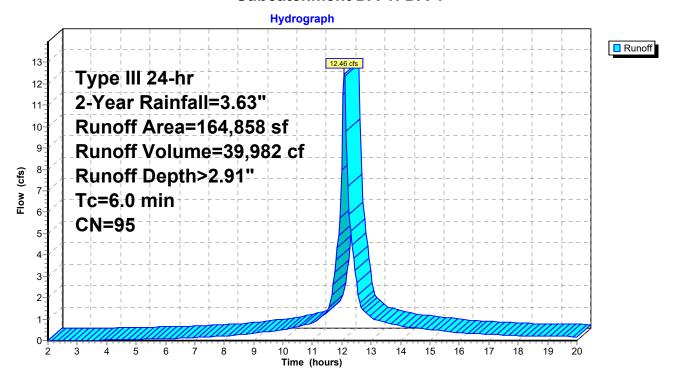
Summary for Subcatchment DA-1: DA-1

Runoff = 12.46 cfs @ 12.09 hrs, Volume= 39,982 cf, Depth> 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.63"

	Area (sf)	CN	Description						
•	8,417	39	>75% Gras	75% Grass cover, Good, HSG A					
	156,441	98	Paved park	aved parking, HSG A					
	164,858	95	Weighted A	verage					
	8,417 5.11% Pervious Area								
	156,441		94.89% lmp	pervious Ar	ea				
Тс	Length	Slope	Velocity	Capacity	Description				
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
6.0					Direct Entry.				

Subcatchment DA-1: DA-1



Runoff (cfs)

0.56

0.52

0.48

0.44 0.41

0.37

0.34

0.33

0.31

0.29

0.27

0.26

0.24

0.22 0.21

0.21

0.20

0.20

0.19

0.19

0.18

0.18

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 7

Hydrograph for Subcatchment DA-1: DA-1

			, ,	-		
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)
2.00	0.07	0.00	0.00	14.75	3.07	2.51
2.25	0.08	0.00	0.00	15.00	3.10	2.55
2.50	0.09	0.00	0.00	15.25	3.13	2.58
2.75	0.10	0.00	0.00	15.50	3.16	2.61
3.00	0.11	0.00	0.00	15.75	3.19	2.64
3.25	0.12	0.00	0.01	16.00	3.22	2.66
3.50	0.13	0.00	0.01	16.25	3.24	2.68
3.75	0.14	0.00	0.02	16.50	3.26	2.70
4.00	0.16	0.00	0.03	16.75	3.28	2.73
4.25	0.17	0.01	0.03	17.00	3.30	2.74
4.50	0.18	0.01	0.04	17.25	3.32	2.76
4.75	0.19	0.01	0.05	17.50	3.34	2.78
5.00	0.21	0.02	0.06	17.75	3.35	2.80
5.25	0.22	0.02	0.06	18.00	3.37	2.81
5.50	0.23	0.02	0.07	18.25	3.38	2.82
5.75	0.25	0.03	0.08	18.50	3.40	2.84
6.00	0.26	0.04	0.09	18.75	3.41	2.85
6.25	0.28	0.04	0.10	19.00	3.42	2.86
6.50	0.29	0.05	0.11	19.25	3.44	2.88
6.75	0.31	0.06	0.13	19.50	3.45	2.89
7.00	0.33	0.07	0.14	19.75	3.46	2.90
7.25	0.35	0.08	0.16	20.00	3.47	2.91
7.50 7.75	0.37 0.39	0.09 0.10	0.17 0.19			
8.00	0.39	0.10	0.19			
8.25	0.41	0.11	0.21			
8.50	0.44	0.15	0.27			
8.75	0.50	0.17	0.31			
9.00	0.53	0.19	0.35			
9.25	0.56	0.21	0.38			
9.50	0.60	0.24	0.43			
9.75	0.64	0.27	0.47			
10.00	0.69	0.30	0.51			
10.25	0.73	0.34	0.57			
10.50	0.79	0.38	0.65			
10.75	0.84	0.43	0.74			
11.00	0.91	0.48	0.82			
11.25	0.98	0.55	1.03			
11.50	1.08	0.63	1.33			
11.75	1.29	0.82	3.19			
12.00	1.81	1.31	8.00			
12.25	2.34	1.81	5.90			
12.50	2.55	2.01	2.69			
12.75	2.65 2.72	2.10 2.18	1.41 1.10			
13.00 13.25	2.72	2.18	0.93			
13.25	2.79	2.24	0.93 0.85			
13.75	2.90	2.35	0.83			
14.00	2.94	2.39	0.69			
14.25	2.99	2.44	0.64			
14.50	3.03	2.48	0.60			
. 1.00	5.55	2.10	0.00			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 8

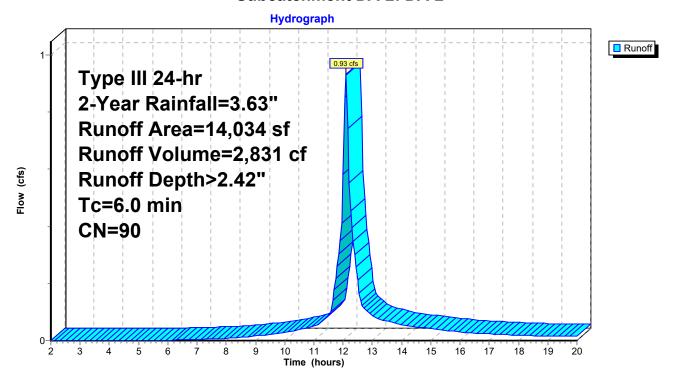
Summary for Subcatchment DA-2: DA-2

Runoff = 0.93 cfs @ 12.09 hrs, Volume= 2,831 cf, Depth> 2.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.63"

_	Α	rea (sf)	CN	Description					
		1,796	39	>75% Grass cover, Good, HSG A					
_		12,238	98	Paved parking, HSG A					
		14,034	90 Weighted Average						
		1,796	6 12.80% Pervious Area						
		12,238		87.20% Imp	pervious Ar	rea			
	т.	ما المحمد ا	Clana	Valacity	Consoitu	Description			
	Tc	Length	Slope	,	Capacity	Description			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	6.0					Direct Entry.			

Subcatchment DA-2: DA-2



Runoff (cfs) 0.04 0.04 0.04 0.04 0.03 0.03 0.03 0.03 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.01 0.01

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 9

Hydrograph for Subcatchment DA-2: DA-2

			, ,	•		
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)
2.00	0.07	0.00	0.00	14.75	3.07	2.04
2.25	0.08	0.00	0.00	15.00	3.10	2.08
2.50	0.09	0.00	0.00	15.25	3.13	2.11
2.75	0.10	0.00	0.00	15.50	3.16	2.14
3.00	0.11	0.00	0.00	15.75	3.19	2.16
3.25	0.12	0.00	0.00	16.00	3.22	2.18
3.50	0.13	0.00	0.00	16.25	3.24	2.20
3.75	0.14	0.00	0.00	16.50	3.26	2.23
4.00	0.16	0.00	0.00	16.75	3.28	2.24
4.25 4.50	0.17 0.18	0.00	0.00 0.00	17.00 17.25	3.30 3.32	2.26 2.28
4.75	0.10	0.00	0.00	17.50	3.34	2.30
5.00	0.13	0.00	0.00	17.75	3.35	2.31
5.25	0.22	0.00	0.00	18.00	3.37	2.33
5.50	0.23	0.00	0.00	18.25	3.38	2.34
5.75	0.25	0.00	0.00	18.50	3.40	2.35
6.00	0.26	0.00	0.00	18.75	3.41	2.36
6.25	0.28	0.00	0.00	19.00	3.42	2.38
6.50	0.29	0.00	0.00	19.25	3.44	2.39
6.75	0.31	0.01	0.00	19.50	3.45	2.40
7.00 7.25	0.33	0.01	0.00	19.75	3.46	2.41
7.25	0.35 0.37	0.01 0.02	0.00 0.01	20.00	3.47	2.42
7.75	0.39	0.02	0.01			
8.00	0.41	0.02	0.01			
8.25	0.44	0.04	0.01			
8.50	0.47	0.04	0.01			
8.75	0.50	0.05	0.01			
9.00	0.53	0.07	0.02			
9.25	0.56	0.08	0.02			
9.50	0.60	0.10	0.02			
9.75	0.64	0.12	0.02			
10.00 10.25	0.69 0.73	0.14 0.16	0.03 0.03			
10.23	0.73	0.10	0.03			
10.75	0.73	0.13	0.04			
11.00	0.91	0.26	0.05			
11.25	0.98	0.31	0.07			
11.50	1.08	0.37	0.09			
11.75	1.29	0.52	0.22			
12.00	1.81	0.94	0.58			
12.25	2.34	1.39	0.46			
12.50	2.55	1.57	0.21			
12.75 13.00	2.65 2.72	1.66 1.73	0.11 0.09			
13.00	2.72	1.73	0.09			
13.50	2.79	1.79	0.07			
13.75	2.90	1.89	0.06			
14.00	2.94	1.93	0.06			
14.25	2.99	1.97	0.05			
14.50	3.03	2.01	0.05			
				I		

Page 10

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

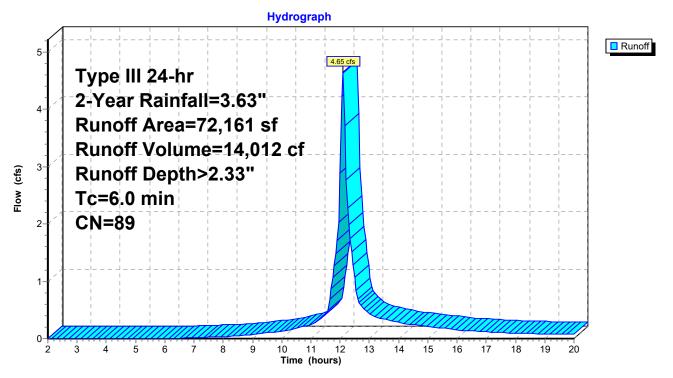
Summary for Subcatchment DA-3a: DA-3a

Runoff = 4.65 cfs @ 12.09 hrs, Volume= 14,012 cf, Depth> 2.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.63"

	Area (sf)	CN	Description				
	11,338	39	>75% Gras	s cover, Go	Good, HSG A		
	60,823	98	Paved park	ing, HSG A	A		
	72,161	89	Weighted Average				
	11,338		15.71% Pei	vious Area	a		
	60,823		84.29% lmp	pervious Ar	rea		
т.		Clana	Valacity	Consoitu	Description		
, To	5	Slope	,	Capacity	!		
(min) (feet)	(ft/ft)	(ft/sec)	(cfs)			
6.0)				Direct Entry.		

Subcatchment DA-3a: DA-3a



Runoff (cfs) 0.23 0.21 0.20 0.18 0.17 0.15 0.14 0.13 0.13 0.12 0.11 0.11 0.10 0.09 0.09 0.09 0.08 80.0 80.0 0.08 0.08 0.07

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 11

Hydrograph for Subcatchment DA-3a: DA-3a

Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00	0.07	0.00	0.00	14.75	3.07	1.96
2.25	0.08	0.00	0.00	15.00	3.10	1.99
2.50	0.09	0.00	0.00	15.25	3.13	2.02
2.75 3.00	0.10 0.11	0.00	0.00 0.00	15.50 15.75	3.16 3.19	2.05 2.07
3.25	0.11	0.00	0.00	16.00	3.19	2.07
3.50	0.12	0.00	0.00	16.25	3.24	2.12
3.75	0.14	0.00	0.00	16.50	3.26	2.14
4.00	0.16	0.00	0.00	16.75	3.28	2.16
4.25	0.17	0.00	0.00	17.00	3.30	2.17
4.50	0.18	0.00	0.00	17.25	3.32	2.19
4.75	0.19	0.00	0.00	17.50	3.34	2.21
5.00	0.21	0.00	0.00	17.75	3.35	2.22
5.25 5.50	0.22 0.23	0.00	0.00 0.00	18.00 18.25	3.37 3.38	2.24 2.25
5.75	0.25	0.00	0.00	18.50	3.40	2.25
6.00	0.26	0.00	0.00	18.75	3.41	2.27
6.25	0.28	0.00	0.00	19.00	3.42	2.29
6.50	0.29	0.00	0.01	19.25	3.44	2.30
6.75	0.31	0.00	0.01	19.50	3.45	2.31
7.00	0.33	0.01	0.01	19.75	3.46	2.32
7.25	0.35	0.01	0.02	20.00	3.47	2.33
7.50	0.37	0.01	0.02			
7.75	0.39	0.01	0.03			
8.00 8.25	0.41 0.44	0.02 0.03	0.03 0.04			
8.50	0.44	0.03	0.04			
8.75	0.50	0.04	0.06			
9.00	0.53	0.05	0.07			
9.25	0.56	0.06	0.08			
9.50	0.60	0.08	0.10			
9.75	0.64	0.10	0.11			
10.00	0.69	0.12	0.13			
10.25	0.73	0.14	0.15			
10.50 10.75	0.79 0.84	0.16 0.19	0.18 0.21			
11.00	0.84	0.19	0.21			
11.25	0.98	0.28	0.32			
11.50	1.08	0.34	0.42			
11.75	1.29	0.48	1.06			
12.00	1.81	0.88	2.88			
12.25	2.34	1.32	2.28			
12.50	2.55	1.50	1.06			
12.75	2.65	1.58	0.56			
13.00 13.25	2.72 2.79	1.65 1.71	0.44 0.37			
13.23	2.79	1.71	0.37			
13.75	2.90	1.70	0.34			
14.00	2.94	1.85	0.28			
14.25	2.99	1.89	0.26			
14.50	3.03	1.92	0.24			

Page 12

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

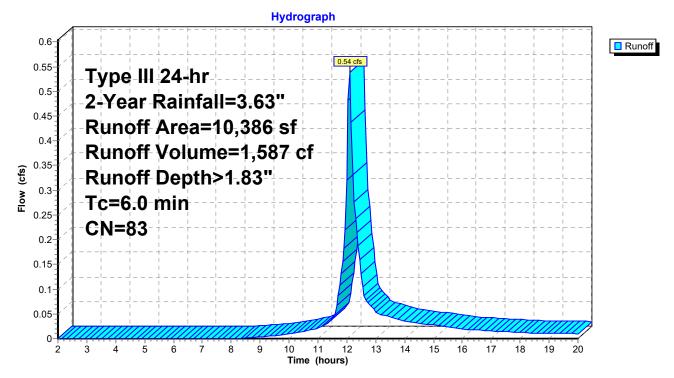
Summary for Subcatchment DA-3b: DA-3b

Runoff = 0.54 cfs @ 12.09 hrs, Volume= 1,587 cf, Depth> 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.63"

_	Aı	rea (sf)	CN	Description				
		2,618	39	>75% Gras	s cover, Go	Good, HSG A		
_		7,768	98	Paved park	ing, HSG A	A		
		10,386	83	Weighted Average				
		2,618		25.21% Per	rvious Area	a		
		7,768		74.79% Imp	pervious Ar	rea		
	_		01		0 ''	D		
	Tc	Length	Slope	,	Capacity	•		
_	(min)	(feet)	(ft/ft) (ft/sec)	(cfs)			
	6.0					Direct Entry.		

Subcatchment DA-3b: DA-3b



Runoff

(cfs) 0.03 0.03

0.03 0.02

0.02

0.02

0.02 0.02

0.02

0.02

0.01

0.01 0.01

0.01 0.01 0.01

0.01 0.01

0.01

0.01

0.01

0.01

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 13

Hydrograph for Subcatchment DA-3b: DA-3b

			, ,	•		
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00	0.07	0.00	0.00	14.75	3.07	1.50
2.25	0.08	0.00	0.00	15.00	3.10	1.53
2.50	0.09	0.00	0.00	15.25	3.13	1.55
2.75	0.10	0.00	0.00	15.50	3.16	1.58
3.00	0.11	0.00	0.00	15.75	3.19	1.60
3.25	0.12	0.00	0.00	16.00	3.22	1.62
3.50	0.13	0.00	0.00	16.25	3.24	1.64
3.75	0.14	0.00	0.00 0.00	16.50	3.26 3.28	1.66
4.00 4.25	0.16 0.17	0.00	0.00	16.75 17.00	3.20	1.68 1.69
4.50	0.17	0.00	0.00	17.00	3.32	1.09
4.75	0.10	0.00	0.00	17.50	3.34	1.72
5.00	0.13	0.00	0.00	17.75	3.35	1.74
5.25	0.22	0.00	0.00	18.00	3.37	1.75
5.50	0.23	0.00	0.00	18.25	3.38	1.76
5.75	0.25	0.00	0.00	18.50	3.40	1.77
6.00	0.26	0.00	0.00	18.75	3.41	1.78
6.25	0.28	0.00	0.00	19.00	3.42	1.79
6.50	0.29	0.00	0.00	19.25	3.44	1.81
6.75	0.31	0.00	0.00	19.50	3.45	1.82
7.00	0.33	0.00	0.00	19.75	3.46	1.83
7.25	0.35	0.00	0.00	20.00	3.47	1.84
7.50	0.37	0.00	0.00			
7.75	0.39	0.00	0.00			
8.00	0.41	0.00	0.00			
8.25	0.44	0.00	0.00			
8.50	0.47	0.00	0.00			
8.75	0.50	0.00	0.00			
9.00	0.53	0.01	0.00			
9.25	0.56	0.01	0.00			
9.50	0.60	0.02	0.01			
9.75	0.64	0.02	0.01			
10.00 10.25	0.69	0.03	0.01			
10.25	0.73 0.79	0.04 0.06	0.01 0.01			
10.30	0.79	0.08	0.01			
11.00	0.91	0.10	0.02			
11.25	0.98	0.13	0.02			
11.50	1.08	0.17	0.04			
11.75	1.29	0.26	0.11			
12.00	1.81	0.57	0.32			
12.25	2.34	0.94	0.28			
12.50	2.55	1.09	0.13			
12.75	2.65	1.17	0.07			
13.00	2.72	1.23	0.06			
13.25	2.79	1.28	0.05			
13.50	2.84	1.32	0.04			
13.75	2.90	1.36	0.04			
14.00	2.94	1.40	0.04			
14.25	2.99	1.44	0.03			
14.50	3.03	1.47	0.03			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 14

Summary for Pond DET-1: Underground Detention System

72,161 sf, 84.29% Impervious, Inflow Depth > 2.33" for 2-Year event Inflow Area =

4.65 cfs @ 12.09 hrs, Volume= Inflow 14.012 cf

13,341 cf, Atten= 64%, Lag= 16.3 min Outflow 1.70 cfs @ 12.36 hrs, Volume=

Primary 1.70 cfs @ 12.36 hrs, Volume= 13,341 cf

Routing by Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 61.65' @ 12.36 hrs Surf.Area= 4,480 sf Storage= 4,495 cf

Plug-Flow detention time= 60.1 min calculated for 13,341 cf (95% of inflow)

Center-of-Mass det. time= 42.3 min (816.2 - 773.9)

Volume	Invert	Avail.Storage	Storage Description
#1	60.60'	7,672 cf	Oldcastle StormCapture SC1 3'x 24 Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
			Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf 4 Rows adjusted for 32.0 cf perimeter wall
#2	60.60'	5,112 cf	Oldcastle StormCapture SC1 3'x 16 Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
			Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf 4 Rows adjusted for 24.0 cf perimeter wall
		40.704.5	T A

12,784 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	64.18'	Automatic Storage Overflow (Discharged without head)
#1	Primary	60.60'	12.0" Round Culvert
			L= 100.0' CMP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 60.60' / 59.40' S= 0.0120 '/' Cc= 0.900
			n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	60.60'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600
			Limited to weir flow at low heads
#3	Device 1	62.60'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.70 cfs @ 12.36 hrs HW=61.65' (Free Discharge)

-1=Culvert (Passes 1.70 cfs of 2.22 cfs potential flow)

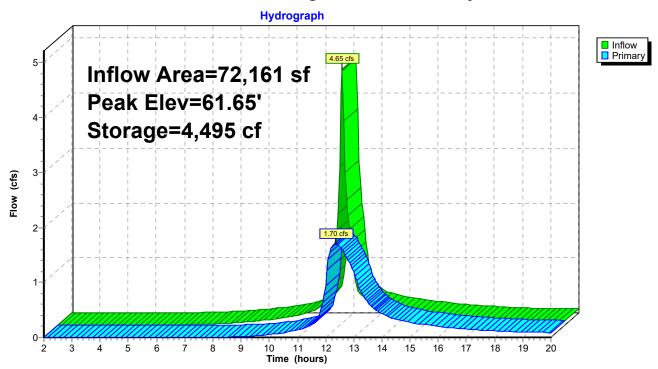
-3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

²⁼Orifice/Grate (Orifice Controls 1.70 cfs @ 4.32 fps)

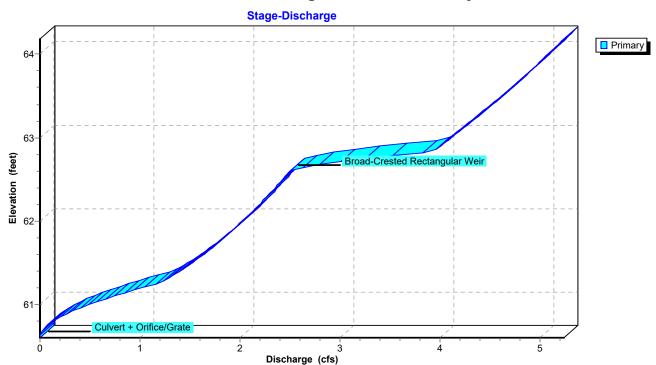
Page 15

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Pond DET-1: Underground Detention System



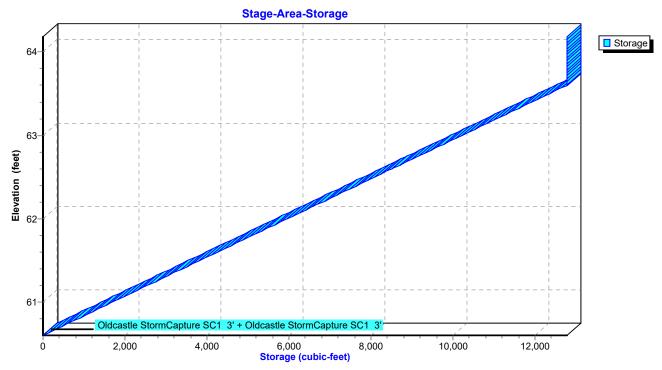
Pond DET-1: Underground Detention System



Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 16

Pond DET-1: Underground Detention System



Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 17

Hydrograph for Pond DET-1: Underground Detention System

(hours) (cfs) (cubic-feet) (feet) (cfs) 2.00 0.00 0.00 0.60 0.00 2.50 0.00 0.60 0.00 3.00 0.00 0.60 0.00 3.50 0.00 0.60 0.00 4.00 0.00 0.60 0.00 4.50 0.00 0.60 0.00 5.00 0.00 0.60 0.00 5.00 0.00 0.60 0.00 6.00 0.00 0.60 0.00 6.00 0.00 0.60 0.00 6.50 0.01 7.60.60 0.00 7.50 0.02 55 60.61 0.00 8.00 0.03 101 60.62 0.00 8.50 0.05 167 60.64 0.01 9.50 0.10 375 60.69 0.03 10.50 0.18 667 60.76 0.08 11.50 0.42	Time	Inflow	Storage	Elevation	Primary
2.00 0.00 0.00 0.00 0.00 2.50 0.00 0.00 0.60 0.00 3.00 0.00 0.00 0.60 0.00 3.50 0.00 0.00 0.60 0.00 4.00 0.00 0.60 0.00 4.50 0.00 0.60 0.00 5.00 0.00 0.60 0.00 5.50 0.00 0.60 0.00 6.00 0.00 0.60 0.00 6.00 0.00 0.60 0.00 6.50 0.01 7.60 0.00 7.50 0.02 55 60.61 0.00 7.50 0.02 55 60.61 0.00 8.50 0.05 167 60.64 0.01 9.50 0.10 375 60.69 0.03 10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 <		(cfs)		(feet)	
2.50 0.00 0 60.60 0.00 3.00 0.00 0 60.60 0.00 3.50 0.00 0 60.60 0.00 4.00 0.00 0 60.60 0.00 4.50 0.00 0 60.60 0.00 5.00 0.00 0 60.60 0.00 5.50 0.00 0 60.60 0.00 6.00 0.00 0 60.60 0.00 6.50 0.01 7 60.60 0.00 7.50 0.02 55 60.61 0.00 8.00 0.03 101 60.62 0.00 8.50 0.05 167 60.64 0.01 9.50 0.10 375 60.69 0.03 10.00 0.13 511 60.72 0.05 10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 </td <td></td> <td>0.00</td> <td>0</td> <td></td> <td></td>		0.00	0		
3.50 0.00 0 60.60 0.00 4.00 0.00 0 60.60 0.00 4.50 0.00 0 60.60 0.00 5.00 0.00 0 60.60 0.00 5.50 0.00 0 60.60 0.00 6.00 0.00 0 60.60 0.00 6.50 0.01 7 60.60 0.00 7.00 0.01 24 60.61 0.00 7.50 0.02 55 60.61 0.00 8.00 0.03 101 60.62 0.00 8.50 0.05 167 60.64 0.01 9.00 0.07 259 60.66 0.01 9.50 0.10 375 60.69 0.03 10.00 0.13 511 60.72 0.05 10.50 0.18 667 60.76 0.08 11.50 0.42 1,115 60.86 0.23					
4.00 0.00 0 60.60 0.00 4.50 0.00 0 60.60 0.00 5.00 0.00 0 60.60 0.00 5.50 0.00 0 60.60 0.00 6.00 0.00 0 60.60 0.00 6.50 0.01 7 60.60 0.00 7.00 0.01 24 60.61 0.00 7.50 0.02 55 60.61 0.00 8.00 0.03 101 60.62 0.00 8.50 0.05 167 60.64 0.01 9.50 0.10 375 60.69 0.03 10.00 0.13 511 60.72 0.05 10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 11.50 0.42 1,115 60.86 0.23 12.50 1.06 4,343 61.62 1.66 13.50 0.34 1,946 61.06 0.64	3.00	0.00	0	60.60	0.00
4.50 0.00 0 60.60 0.00 5.00 0.00 0 60.60 0.00 5.50 0.00 0 60.60 0.00 6.00 0.00 0 60.60 0.00 6.50 0.01 7 60.60 0.00 7.00 0.01 24 60.61 0.00 7.50 0.02 55 60.61 0.00 8.00 0.03 101 60.62 0.00 8.50 0.05 167 60.64 0.01 9.00 0.07 259 60.66 0.01 9.50 0.10 375 60.69 0.03 10.00 0.13 511 60.72 0.05 10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 11.50 0.42 1,115 60.86 0.23 12.50 1.06 4,343 61.62 1.66 13.50 0.34 1,946 61.06 0.64	3.50	0.00	0	60.60	0.00
5.00 0.00 0 60.60 0.00 5.50 0.00 0 60.60 0.00 6.00 0.00 0 60.60 0.00 6.50 0.01 7 60.60 0.00 7.00 0.01 24 60.61 0.00 7.50 0.02 55 60.61 0.00 8.00 0.03 101 60.62 0.00 8.50 0.05 167 60.64 0.01 9.00 0.07 259 60.66 0.01 9.50 0.10 375 60.69 0.03 10.00 0.13 511 60.72 0.05 10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 11.50 0.42 1,115 60.86 0.23 12.00 2.88 2,437 61.17 0.94 13.50 1.06 4,343 61.62 <t< td=""><td>4.00</td><td>0.00</td><td>0</td><td>60.60</td><td>0.00</td></t<>	4.00	0.00	0	60.60	0.00
5.50 0.00 0 60.60 0.00 6.00 0.00 0 60.60 0.00 6.50 0.01 7 60.60 0.00 7.00 0.01 24 60.61 0.00 7.50 0.02 55 60.61 0.00 8.00 0.03 101 60.62 0.00 8.50 0.05 167 60.64 0.01 9.00 0.07 259 60.66 0.01 9.50 0.10 375 60.69 0.03 10.00 0.13 511 60.72 0.05 10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 11.50 0.42 1,115 60.86 0.23 12.00 2.88 2,437 61.17 0.94 12.50 1.06 4,343 61.62 1.66 13.00 0.44 2,828 61.26	4.50	0.00	0	60.60	0.00
6.00 0.00 0 60.60 0.00 6.50 0.01 7 60.60 0.00 7.00 0.01 24 60.61 0.00 7.50 0.02 55 60.61 0.00 8.00 0.03 101 60.62 0.00 8.50 0.05 167 60.64 0.01 9.00 0.07 259 60.66 0.01 9.50 0.10 375 60.69 0.03 10.00 0.13 511 60.72 0.05 10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 11.50 0.42 1,115 60.86 0.23 12.00 2.88 2,437 61.17 0.94 12.50 1.06 4,343 61.62 1.66 13.00 0.44 2,828 61.26 1.20 13.50 0.34 1,946 61.06					0.00
6.50 0.01 7 60.60 0.00 7.00 0.01 24 60.61 0.00 7.50 0.02 55 60.61 0.00 8.00 0.03 101 60.62 0.00 8.50 0.05 167 60.64 0.01 9.00 0.07 259 60.66 0.01 9.50 0.10 375 60.69 0.03 10.00 0.13 511 60.72 0.05 10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 11.50 0.42 1,115 60.86 0.23 12.00 2.88 2,437 61.17 0.94 12.50 1.06 4,343 61.62 1.66 13.00 0.44 2,828 61.26 1.20 13.50 0.34 1,946 61.06 0.64 14.00 0.28 1,572 60.97<					
7.00 0.01 24 60.61 0.00 7.50 0.02 55 60.61 0.00 8.00 0.03 101 60.62 0.00 8.50 0.05 167 60.64 0.01 9.00 0.07 259 60.66 0.01 9.50 0.10 375 60.69 0.03 10.00 0.13 511 60.72 0.05 10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 11.50 0.42 1,115 60.86 0.23 12.00 2.88 2,437 61.17 0.94 12.50 1.06 4,343 61.62 1.66 13.00 0.44 2,828 61.26 1.20 13.50 0.34 1,946 61.06 0.64 14.00 0.28 1,572 60.97 0.43 15.50 0.18 1,134 6					
7.50 0.02 55 60.61 0.00 8.00 0.03 101 60.62 0.00 8.50 0.05 167 60.64 0.01 9.00 0.07 259 60.66 0.01 9.50 0.10 375 60.69 0.03 10.00 0.13 511 60.72 0.05 10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 11.50 0.42 1,115 60.86 0.23 12.00 2.88 2,437 61.17 0.94 12.50 1.06 4,343 61.62 1.66 13.00 0.44 2,828 61.26 1.20 13.50 0.34 1,946 61.06 0.64 14.00 0.28 1,572 60.97 0.43 15.50 0.18 1,134 60.89 0.27 15.50 0.18 1,134 <					
8.00 0.03 101 60.62 0.00 8.50 0.05 167 60.64 0.01 9.00 0.07 259 60.66 0.01 9.50 0.10 375 60.69 0.03 10.00 0.13 511 60.72 0.05 10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 11.50 0.42 1,115 60.86 0.23 12.00 2.88 2,437 61.17 0.94 12.50 1.06 4,343 61.62 1.66 13.00 0.44 2,828 61.26 1.20 13.50 0.34 1,946 61.06 0.64 14.00 0.28 1,572 60.97 0.43 14.50 0.24 1,364 60.92 0.33 15.00 0.21 1,234 60.89 0.27 15.50 0.18 1,134 60.87 0.23 16.50 0.13 964 60.83					
8.50 0.05 167 60.64 0.01 9.00 0.07 259 60.66 0.01 9.50 0.10 375 60.69 0.03 10.00 0.13 511 60.72 0.05 10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 11.50 0.42 1,115 60.86 0.23 12.00 2.88 2,437 61.17 0.94 12.50 1.06 4,343 61.62 1.66 13.00 0.44 2,828 61.26 1.20 13.50 0.34 1,946 61.06 0.64 14.00 0.28 1,572 60.97 0.43 14.50 0.24 1,364 60.92 0.33 15.00 0.21 1,234 60.89 0.27 15.50 0.18 1,134 60.87 0.23 16.50 0.13 964 60.83 0.17 17.50 0.11 849 60.80 <td< td=""><td></td><td></td><td></td><td></td><td></td></td<>					
9.00 0.07 259 60.66 0.01 9.50 0.10 375 60.69 0.03 10.00 0.13 511 60.72 0.05 10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 11.50 0.42 1,115 60.86 0.23 12.00 2.88 2,437 61.17 0.94 12.50 1.06 4,343 61.62 1.66 13.00 0.44 2,828 61.26 1.20 13.50 0.34 1,946 61.06 0.64 14.00 0.28 1,572 60.97 0.43 14.50 0.24 1,364 60.92 0.33 15.00 0.21 1,234 60.89 0.27 15.50 0.18 1,134 60.87 0.23 16.50 0.13 964 60.83 0.17 17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 <t< td=""><td></td><td></td><td></td><td></td><td></td></t<>					
9.50 0.10 375 60.69 0.03 10.00 0.13 511 60.72 0.05 10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 11.50 0.42 1,115 60.86 0.23 12.00 2.88 2,437 61.17 0.94 12.50 1.06 4,343 61.62 1.66 13.00 0.44 2,828 61.26 1.20 13.50 0.34 1,946 61.06 0.64 14.00 0.28 1,572 60.97 0.43 14.50 0.24 1,364 60.92 0.33 15.00 0.21 1,234 60.89 0.27 15.50 0.18 1,134 60.87 0.23 16.50 0.13 964 60.83 0.17 17.00 0.12 903 60.81 0.15 17.50 0.11 849					
10.00 0.13 511 60.72 0.05 10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 11.50 0.42 1,115 60.86 0.23 12.00 2.88 2,437 61.17 0.94 12.50 1.06 4,343 61.62 1.66 13.00 0.44 2,828 61.26 1.20 13.50 0.34 1,946 61.06 0.64 14.00 0.28 1,572 60.97 0.43 14.50 0.24 1,364 60.92 0.33 15.00 0.21 1,234 60.89 0.27 15.50 0.18 1,134 60.87 0.23 16.00 0.15 1,044 60.85 0.20 16.50 0.13 964 60.83 0.17 17.50 0.11 849 60.80 0.13 18.00 0.09 799					
10.50 0.18 667 60.76 0.08 11.00 0.24 851 60.80 0.13 11.50 0.42 1,115 60.86 0.23 12.00 2.88 2,437 61.17 0.94 12.50 1.06 4,343 61.62 1.66 13.00 0.44 2,828 61.26 1.20 13.50 0.34 1,946 61.06 0.64 14.00 0.28 1,572 60.97 0.43 14.50 0.24 1,364 60.92 0.33 15.00 0.21 1,234 60.89 0.27 15.50 0.18 1,134 60.87 0.23 16.00 0.15 1,044 60.85 0.20 16.50 0.13 964 60.83 0.17 17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 0.12 18.50 0.09 755					
11.00 0.24 851 60.80 0.13 11.50 0.42 1,115 60.86 0.23 12.00 2.88 2,437 61.17 0.94 12.50 1.06 4,343 61.62 1.66 13.00 0.44 2,828 61.26 1.20 13.50 0.34 1,946 61.06 0.64 14.00 0.28 1,572 60.97 0.43 14.50 0.24 1,364 60.92 0.33 15.00 0.21 1,234 60.89 0.27 15.50 0.18 1,134 60.87 0.23 16.00 0.15 1,044 60.85 0.20 16.50 0.13 964 60.83 0.17 17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 0.12 18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10					
11.50 0.42 1,115 60.86 0.23 12.00 2.88 2,437 61.17 0.94 12.50 1.06 4,343 61.62 1.66 13.00 0.44 2,828 61.26 1.20 13.50 0.34 1,946 61.06 0.64 14.00 0.28 1,572 60.97 0.43 14.50 0.24 1,364 60.92 0.33 15.00 0.21 1,234 60.89 0.27 15.50 0.18 1,134 60.87 0.23 16.00 0.15 1,044 60.85 0.20 16.50 0.13 964 60.83 0.17 17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 0.12 18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10					
12.00 2.88 2,437 61.17 0.94 12.50 1.06 4,343 61.62 1.66 13.00 0.44 2,828 61.26 1.20 13.50 0.34 1,946 61.06 0.64 14.00 0.28 1,572 60.97 0.43 14.50 0.24 1,364 60.92 0.33 15.00 0.21 1,234 60.89 0.27 15.50 0.18 1,134 60.87 0.23 16.00 0.15 1,044 60.85 0.20 16.50 0.13 964 60.83 0.17 17.00 0.12 903 60.81 0.15 17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 0.12 18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10					
12.50 1.06 4,343 61.62 1.66 13.00 0.44 2,828 61.26 1.20 13.50 0.34 1,946 61.06 0.64 14.00 0.28 1,572 60.97 0.43 14.50 0.24 1,364 60.92 0.33 15.00 0.21 1,234 60.89 0.27 15.50 0.18 1,134 60.87 0.23 16.00 0.15 1,044 60.85 0.20 16.50 0.13 964 60.83 0.17 17.00 0.12 903 60.81 0.15 17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 0.12 18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10					
13.00 0.44 2,828 61.26 1.20 13.50 0.34 1,946 61.06 0.64 14.00 0.28 1,572 60.97 0.43 14.50 0.24 1,364 60.92 0.33 15.00 0.21 1,234 60.89 0.27 15.50 0.18 1,134 60.87 0.23 16.00 0.15 1,044 60.85 0.20 16.50 0.13 964 60.83 0.17 17.00 0.12 903 60.81 0.15 17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 0.12 18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10					
13.50 0.34 1,946 61.06 0.64 14.00 0.28 1,572 60.97 0.43 14.50 0.24 1,364 60.92 0.33 15.00 0.21 1,234 60.89 0.27 15.50 0.18 1,134 60.87 0.23 16.00 0.15 1,044 60.85 0.20 16.50 0.13 964 60.83 0.17 17.00 0.12 903 60.81 0.15 17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 0.12 18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10			•		
14.00 0.28 1,572 60.97 0.43 14.50 0.24 1,364 60.92 0.33 15.00 0.21 1,234 60.89 0.27 15.50 0.18 1,134 60.87 0.23 16.00 0.15 1,044 60.85 0.20 16.50 0.13 964 60.83 0.17 17.00 0.12 903 60.81 0.15 17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 0.12 18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10					
14.50 0.24 1,364 60.92 0.33 15.00 0.21 1,234 60.89 0.27 15.50 0.18 1,134 60.87 0.23 16.00 0.15 1,044 60.85 0.20 16.50 0.13 964 60.83 0.17 17.00 0.12 903 60.81 0.15 17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 0.12 18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10					
15.00 0.21 1,234 60.89 0.27 15.50 0.18 1,134 60.87 0.23 16.00 0.15 1,044 60.85 0.20 16.50 0.13 964 60.83 0.17 17.00 0.12 903 60.81 0.15 17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 0.12 18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10					
15.50 0.18 1,134 60.87 0.23 16.00 0.15 1,044 60.85 0.20 16.50 0.13 964 60.83 0.17 17.00 0.12 903 60.81 0.15 17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 0.12 18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10					
16.00 0.15 1,044 60.85 0.20 16.50 0.13 964 60.83 0.17 17.00 0.12 903 60.81 0.15 17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 0.12 18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10					
16.50 0.13 964 60.83 0.17 17.00 0.12 903 60.81 0.15 17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 0.12 18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10					
17.00 0.12 903 60.81 0.15 17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 0.12 18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10					
17.50 0.11 849 60.80 0.13 18.00 0.09 799 60.79 0.12 18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10					
18.00 0.09 799 60.79 0.12 18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10					
18.50 0.09 755 60.78 0.11 19.00 0.08 722 60.77 0.10					
19.00 0.08 722 60.77 0.10					
	19.50	0.08	695	60.76	0.10
20.00 0.07 672 60.76 0.09					

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 18

Summary for Link POA-1: Mill Brook

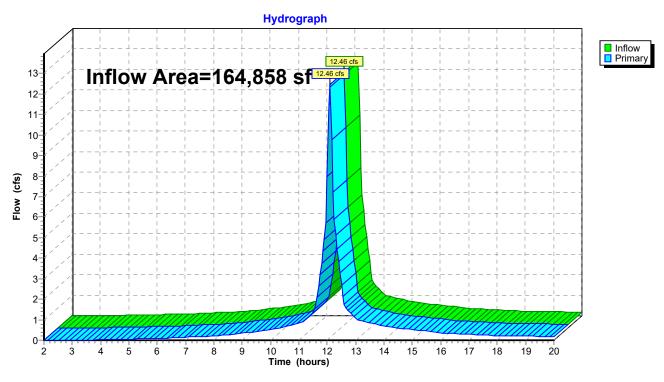
Inflow Area = 164,858 sf, 94.89% Impervious, Inflow Depth > 2.91" for 2-Year event

Inflow = 12.46 cfs @ 12.09 hrs, Volume= 39,982 cf

Primary = 12.46 cfs @ 12.09 hrs, Volume= 39,982 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-1: Mill Brook



Primary (cfs) 0.56 0.52 0.48 0.44 0.41 0.37 0.34 0.33 0.31 0.29 0.27 0.26 0.24 0.22 0.21 0.21 0.20 0.20 0.19 0.19 0.18 0.18

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 19

Hydrograph for Link POA-1: Mill Brook

			,			
Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.00	0.00	0.00	14.75	0.56	0.00
2.25	0.00	0.00	0.00	15.00	0.52	0.00
2.50	0.00	0.00	0.00	15.25	0.48	0.00
2.75	0.00	0.00	0.00	15.50	0.44	0.00
3.00	0.00	0.00	0.00	15.75	0.41	0.00
3.25	0.01	0.00	0.01	16.00	0.37	0.00
3.50	0.01	0.00	0.01	16.25	0.34	0.00
3.75	0.02	0.00	0.02	16.50	0.33	0.00
4.00	0.03	0.00	0.03	16.75	0.31	0.00
4.25	0.03	0.00	0.03	17.00	0.29	0.00
4.50	0.04	0.00	0.04	17.25	0.27	0.00
4.75	0.05	0.00	0.05	17.50	0.26	0.00
5.00	0.06	0.00	0.06	17.75	0.24	0.00
5.25 5.50	0.06 0.07	0.00 0.00	0.06 0.07	18.00 18.25	0.22 0.21	0.00 0.00
5.75	0.07	0.00	0.07	18.50	0.21	0.00
6.00	0.08	0.00	0.08	18.75	0.21	0.00
6.25	0.03	0.00	0.10	19.00	0.20	0.00
6.50	0.11	0.00	0.11	19.25	0.19	0.00
6.75	0.13	0.00	0.13	19.50	0.19	0.00
7.00	0.14	0.00	0.14	19.75	0.18	0.00
7.25	0.16	0.00	0.16	20.00	0.18	0.00
7.50	0.17	0.00	0.17			
7.75	0.19	0.00	0.19			
8.00	0.21	0.00	0.21			
8.25	0.24	0.00	0.24			
8.50	0.27	0.00	0.27			
8.75	0.31	0.00	0.31			
9.00	0.35	0.00	0.35			
9.25	0.38	0.00	0.38			
9.50	0.43	0.00	0.43			
9.75	0.47	0.00	0.47			
10.00	0.51	0.00	0.51			
10.25	0.57	0.00	0.57			
10.50 10.75	0.65 0.74	0.00 0.00	0.65 0.74			
11.00	0.74	0.00	0.74			
11.00	1.03	0.00	1.03			
11.50	1.33	0.00	1.33			
11.75	3.19	0.00	3.19			
12.00	8.00	0.00	8.00			
12.25	5.90	0.00	5.90			
12.50	2.69	0.00	2.69			
12.75	1.41	0.00	1.41			
13.00	1.10	0.00	1.10			
13.25	0.93	0.00	0.93			
13.50	0.85	0.00	0.85			
13.75	0.77	0.00	0.77			
14.00	0.69	0.00	0.69			
14.25	0.64	0.00	0.64			
14.50	0.60	0.00	0.60			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 20

Summary for Link POA-2: Grove Street

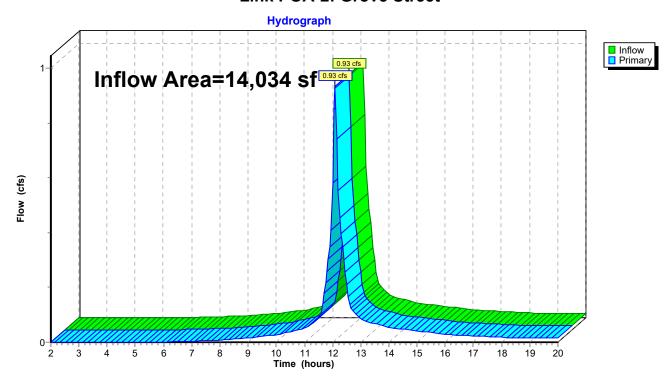
Inflow Area = 14,034 sf, 87.20% Impervious, Inflow Depth > 2.42" for 2-Year event

Inflow = 0.93 cfs @ 12.09 hrs, Volume= 2,831 cf

Primary = 0.93 cfs @ 12.09 hrs, Volume= 2,831 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-2: Grove Street



Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 21

Hydrograph for Link POA-2: Grove Street

Time	Inflow	Elevation	Primary	Time	Inflow	Elevation	Primary
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)	(cfs)
2.00	0.00	0.00	0.00	14.75	0.04	0.00	0.04
2.25	0.00	0.00	0.00	15.00	0.04	0.00	0.04
2.50	0.00	0.00	0.00	15.25	0.04	0.00	0.04
2.75	0.00	0.00	0.00	15.50	0.04	0.00	0.04
3.00 3.25	0.00 0.00	0.00 0.00	0.00 0.00	15.75 16.00	0.03 0.03	0.00 0.00	0.03 0.03
3.50	0.00	0.00	0.00	16.25	0.03	0.00	0.03
3.75	0.00	0.00	0.00	16.50	0.03	0.00	0.03
4.00	0.00	0.00	0.00	16.75	0.03	0.00	0.03
4.25	0.00	0.00	0.00	17.00	0.02	0.00	0.02
4.50	0.00	0.00	0.00	17.25	0.02	0.00	0.02
4.75	0.00	0.00	0.00	17.50	0.02	0.00	0.02
5.00	0.00	0.00	0.00	17.75	0.02	0.00	0.02
5.25	0.00	0.00	0.00	18.00	0.02	0.00	0.02
5.50	0.00	0.00	0.00	18.25	0.02	0.00	0.02
5.75	0.00	0.00	0.00	18.50	0.02	0.00	0.02
6.00	0.00	0.00	0.00	18.75	0.02	0.00	0.02
6.25	0.00	0.00	0.00	19.00	0.02	0.00	0.02
6.50	0.00	0.00	0.00	19.25	0.02	0.00	0.02
6.75	0.00	0.00	0.00	19.50	0.02	0.00	0.02
7.00	0.00	0.00	0.00	19.75	0.01	0.00	0.01
7.25	0.00	0.00	0.00	20.00	0.01	0.00	0.01
7.50	0.01	0.00	0.01				
7.75	0.01	0.00	0.01				
8.00	0.01	0.00	0.01				
8.25	0.01	0.00	0.01				
8.50	0.01	0.00	0.01				
8.75	0.01	0.00	0.01				
9.00 9.25	0.02 0.02	0.00 0.00	0.02 0.02				
9.25	0.02	0.00	0.02				
9.75	0.02	0.00	0.02				
10.00	0.02	0.00	0.02				
10.25	0.03	0.00	0.03				
10.50	0.04	0.00	0.04				
10.75	0.04	0.00	0.04				
11.00	0.05	0.00	0.05				
11.25	0.07	0.00	0.07				
11.50	0.09	0.00	0.09				
11.75	0.22	0.00	0.22				
12.00	0.58	0.00	0.58				
12.25	0.46	0.00	0.46				
12.50	0.21	0.00	0.21				
12.75	0.11	0.00	0.11				
13.00	0.09	0.00	0.09				
13.25	0.07	0.00	0.07				
13.50	0.07	0.00	0.07				
13.75	0.06	0.00	0.06				
14.00 14.25	0.06 0.05	0.00 0.00	0.06 0.05				
14.25	0.05	0.00	0.05				
17.50	0.03	0.00	0.00				

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 22

Summary for Link POA-3: Arlington High School

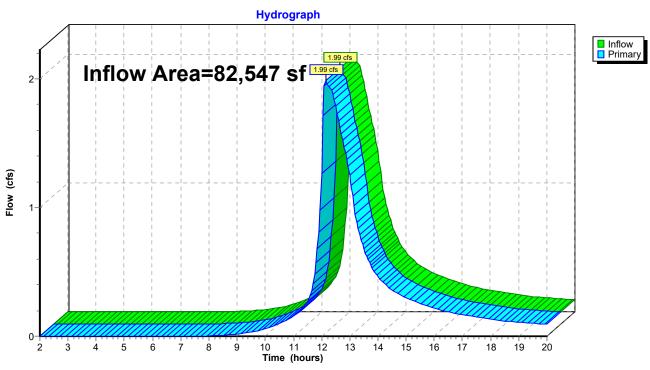
Inflow Area = 82,547 sf, 83.09% Impervious, Inflow Depth > 2.17" for 2-Year event

Inflow = 1.99 cfs @ 12.15 hrs, Volume= 14,929 cf

Primary = 1.99 cfs @ 12.15 hrs, Volume= 14,929 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-3: Arlington High School



HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 23

Hydrograph for Link POA-3: Arlington High School

				_			
Time	Inflow	Elevation	Primary	Time	Inflow	Elevation	Primary
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)	(cfs)
2.00	0.00	0.00	0.00	14.75	0.33	0.00	0.33
2.25	0.00	0.00	0.00	15.00	0.30	0.00	0.30
2.50	0.00	0.00	0.00	15.25	0.28	0.00	0.28
2.75	0.00	0.00	0.00	15.50	0.26	0.00	0.26
3.00 3.25	0.00 0.00	0.00 0.00	0.00 0.00	15.75 16.00	0.24 0.22	0.00 0.00	0.24 0.22
3.50	0.00	0.00	0.00	16.00	0.22	0.00	0.22
3.75	0.00	0.00	0.00	16.23	0.20	0.00	0.20
4.00	0.00	0.00	0.00	16.75	0.18	0.00	0.18
4.25	0.00	0.00	0.00	17.00	0.17	0.00	0.17
4.50	0.00	0.00	0.00	17.25	0.16	0.00	0.16
4.75	0.00	0.00	0.00	17.50	0.15	0.00	0.15
5.00	0.00	0.00	0.00	17.75	0.14	0.00	0.14
5.25	0.00	0.00	0.00	18.00	0.13	0.00	0.13
5.50	0.00	0.00	0.00	18.25	0.12	0.00	0.12
5.75	0.00	0.00	0.00	18.50	0.12	0.00	0.12
6.00	0.00	0.00	0.00	18.75	0.11	0.00	0.11
6.25	0.00	0.00	0.00	19.00	0.11	0.00	0.11
6.50	0.00	0.00	0.00	19.25	0.11	0.00	0.11
6.75	0.00	0.00	0.00	19.50	0.10	0.00	0.10
7.00	0.00	0.00	0.00	19.75	0.10	0.00	0.10
7.25	0.00	0.00	0.00	20.00	0.10	0.00	0.10
7.50	0.00	0.00	0.00				
7.75	0.00	0.00	0.00				
8.00	0.00	0.00	0.00				
8.25	0.00	0.00	0.00				
8.50	0.01	0.00	0.01				
8.75	0.01	0.00	0.01				
9.00	0.02	0.00	0.02				
9.25	0.02	0.00	0.02				
9.50 9.75	0.03 0.04	0.00 0.00	0.03				
10.00	0.04	0.00	0.04 0.06				
10.00	0.00	0.00	0.08				
10.50	0.10	0.00	0.10				
10.75	0.12	0.00	0.10				
11.00	0.16	0.00	0.16				
11.25	0.20	0.00	0.20				
11.50	0.27	0.00	0.27				
11.75	0.48	0.00	0.48				
12.00	1.26	0.00	1.26				
12.25	1.94	0.00	1.94				
12.50	1.79	0.00	1.79				
12.75	1.52	0.00	1.52				
13.00	1.26	0.00	1.26				
13.25	0.89	0.00	0.89				
13.50	0.68	0.00	0.68				
13.75	0.55	0.00	0.55				
14.00	0.47	0.00	0.47				
14.25	0.41	0.00	0.41				
14.50	0.36	0.00	0.36				

Proposed Conditions - NOAA ++ Rainfall Type III 24-hr 10-Year Rainfall=5.79"

Prepared by Weston & Sampson

Printed 11/25/2020

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 24

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: DA-1 Runoff Area=164,858 sf 94.89% Impervious Runoff Depth>4.95"

Tc=6.0 min CN=95 Runoff=20.52 cfs 68,015 cf

SubcatchmentDA-2: DA-2 Runoff Area=14,034 sf 87.20% Impervious Runoff Depth>4.39"

Tc=6.0 min CN=90 Runoff=1.64 cfs 5,140 cf

SubcatchmentDA-3a: DA-3a Runoff Area=72,161 sf 84.29% Impervious Runoff Depth>4.29"

Tc=6.0 min CN=89 Runoff=8.28 cfs 25,779 cf

SubcatchmentDA-3b: DA-3b Runoff Area=10,386 sf 74.79% Impervious Runoff Depth>3.66"

Tc=6.0 min CN=83 Runoff=1.06 cfs 3,170 cf

Pond DET-1: Underground Detention Peak Elev=62.56' Storage=8,361 cf Inflow=8.28 cfs 25,779 cf

Outflow=2.47 cfs 24,921 cf

Link POA-1: Mill Brook Inflow=20.52 cfs 68,015 cf

Primary=20.52 cfs 68,015 cf

Link POA-2: Grove Street Inflow=1.64 cfs 5,140 cf

Primary=1.64 cfs 5,140 cf

Link POA-3: Arlington High School Inflow=3.12 cfs 28,091 cf

Primary=3.12 cfs 28,091 cf

Total Runoff Area = 261,439 sf Runoff Volume = 102,103 cf Average Runoff Depth = 4.69" 9.24% Pervious = 24,169 sf 90.76% Impervious = 237,270 sf

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 25

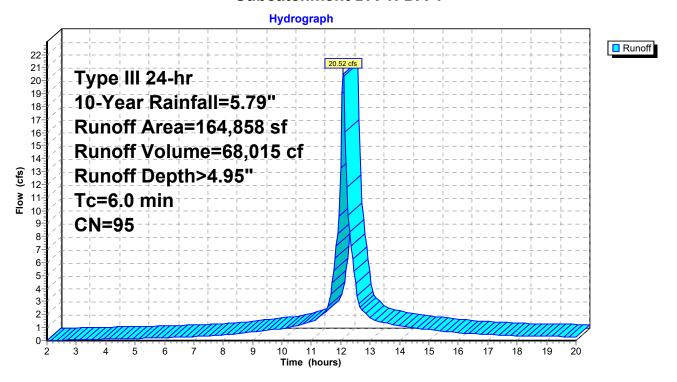
Summary for Subcatchment DA-1: DA-1

Runoff = 20.52 cfs @ 12.09 hrs, Volume= 68,015 cf, Depth> 4.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=5.79"

	Area (sf)	CN	Description				
	8,417	39	>75% Gras	s cover, Go	Good, HSG A		
	156,441	98	Paved park	ing, HSG A	A		
	164,858	95	Weighted Average				
	8,417		5.11% Pervious Area				
	156,441		94.89% Imp	pervious Ar	rea		
Тс	9	Slope	,	Capacity	•		
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
6.0					Direct Entry.		

Subcatchment DA-1: DA-1



Runoff (cfs) 0.91 0.84 0.78 0.72 0.66 0.59 0.55 0.52 0.50 0.47 0.44 0.42 0.39 0.36 0.35 0.34 0.33 0.32 0.31 0.30 0.30 0.29 Page 26

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Hydrograph for Subcatchment DA-1: DA-1

			riyarog	ιαριι ισι	Subcatt	
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00	0.12	0.00	0.00	14.75	4.89	4.31
2.25	0.13	0.00	0.02	15.00	4.95	4.37
2.50 2.75	0.15 0.16	0.00 0.01	0.03 0.04	15.25 15.50	5.00 5.05	4.42 4.47
3.00	0.18	0.01	0.04	15.75	5.09	4.51
3.25	0.10	0.01	0.07	16.00	5.13	4.55
3.50	0.21	0.02	0.08	16.25	5.17	4.58
3.75	0.23	0.02	0.09	16.50	5.20	4.62
4.00	0.25	0.03	0.11	16.75	5.23	4.65
4.25	0.27	0.04	0.12	17.00	5.27	4.68
4.50 4.75	0.29 0.31	0.05 0.06	0.13 0.14	17.25 17.50	5.30 5.32	4.71 4.74
5.00	0.33	0.00	0.14	17.30	5.35	4.74
5.25	0.35	0.08	0.17	18.00	5.37	4.79
5.50	0.37	0.09	0.18	18.25	5.40	4.81
5.75	0.39	0.10	0.20	18.50	5.42	4.83
6.00	0.42	0.12	0.21	18.75	5.44	4.86
6.25	0.44	0.13	0.23	19.00	5.46	4.88
6.50 6.75	0.47 0.49	0.15 0.17	0.26 0.28	19.25 19.50	5.48 5.50	4.90 4.92
7.00	0.49	0.17	0.28	19.30	5.52	4.94
7.25	0.56	0.21	0.34	20.00	5.54	4.96
7.50	0.59	0.23	0.37			
7.75	0.62	0.26	0.40			
8.00	0.66	0.28	0.43			
8.25	0.70 0.74	0.32	0.48			
8.50 8.75	0.74	0.35 0.39	0.54 0.60			
9.00	0.73	0.43	0.66			
9.25	0.90	0.48	0.73			
9.50	0.96	0.53	0.79			
9.75	1.03	0.59	0.86			
10.00	1.09	0.65	0.93			
10.25 10.50	1.17 1.25	0.71 0.79	1.03 1.17			
10.75	1.35	0.73	1.30			
11.00	1.45	0.96	1.43			
11.25	1.57	1.08	1.79			
11.50	1.73	1.22	2.29			
11.75	2.06	1.54	5.40			
12.00 12.25	2.89 3.73	2.35 3.17	13.27 9.64			
12.50	4.06	3.49	4.37			
12.75	4.22	3.65	2.28			
13.00	4.34	3.77	1.78			
13.25	4.44	3.87	1.51			
13.50	4.54	3.96	1.38			
13.75 14.00	4.62 4.70	4.04 4.12	1.25 1.12			
14.00	4.76	4.12	1.03			
14.50	4.83	4.25	0.97			

Page 27

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

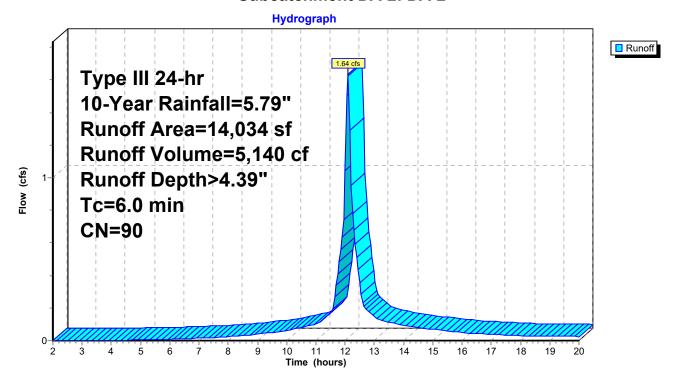
Summary for Subcatchment DA-2: DA-2

Runoff = 1.64 cfs @ 12.09 hrs, Volume= 5,140 cf, Depth> 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=5.79"

	Α	rea (sf)	CN	N Description					
		1,796	39	>75% Gras	Good, HSG A				
		12,238	98	Paved park	ing, HSG A	A			
		14,034	90) Weighted Average					
		1,796		12.80% Pervious Area					
		12,238		87.20% Imp	pervious Ar	rea			
	т.	ما المحمد ا	Clana	Valacity	Consoitu	Description			
	Tc	Length	Slope	,	Capacity	·			
((min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	6.0					Direct Entry.			

Subcatchment DA-2: DA-2



Runoff (cfs)

0.08

0.07 0.06

0.06

0.05 0.05

0.05

0.04

0.04

0.04 0.04

0.03

0.03

0.03

0.03

0.03

0.03

0.03

0.03

0.03 0.02

0.02

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 28

Hydrograph for Subcatchment DA-2: DA-2

			, ,	-		
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)
2.00	0.12	0.00	0.00	14.75	4.89	3.77
2.25	0.13	0.00	0.00	15.00	4.95	3.82
2.50	0.15	0.00	0.00	15.25	5.00	3.87
2.75	0.16	0.00	0.00	15.50	5.05	3.92
3.00	0.18	0.00	0.00	15.75	5.09	3.96
3.25	0.19	0.00	0.00	16.00	5.13	4.00
3.50	0.21	0.00	0.00	16.25	5.17	4.04
3.75	0.23	0.00	0.00	16.50	5.20	4.07
4.00	0.25	0.00	0.00	16.75	5.23	4.10
4.25	0.27	0.00	0.00	17.00	5.27	4.13
4.50	0.29	0.00	0.00	17.25	5.30	4.16
4.75	0.31	0.01	0.00	17.50	5.32	4.19
5.00	0.33	0.01	0.00	17.75	5.35	4.21
5.25	0.35	0.01	0.01	18.00	5.37	4.24
5.50	0.37	0.02	0.01	18.25	5.40	4.26
5.75	0.39	0.02	0.01	18.50	5.42	4.28
6.00 6.25	0.42 0.44	0.03	0.01 0.01	18.75	5.44 5.46	4.30 4.32
6.50	0.44	0.04 0.04	0.01	19.00 19.25	5.48	4.34
6.75	0.47	0.04	0.01	19.23	5.50	4.34
7.00	0.52	0.05	0.01	19.75	5.52	4.38
7.25	0.56	0.08	0.02	20.00	5.54	4.40
7.50	0.59	0.09	0.02	20.00	0.04	7.70
7.75	0.62	0.11	0.02			
8.00	0.66	0.12	0.02			
8.25	0.70	0.14	0.03			
8.50	0.74	0.17	0.03			
8.75	0.79	0.19	0.03			
9.00	0.84	0.22	0.04			
9.25	0.90	0.26	0.04			
9.50	0.96	0.29	0.05			
9.75	1.03	0.34	0.06			
10.00	1.09	0.38	0.06			
10.25	1.17	0.44	0.07			
10.50	1.25	0.50	0.08			
10.75 11.00	1.35 1.45	0.57 0.64	0.09 0.10			
11.00	1.45	0.64	0.10			
11.50	1.73	0.74	0.13			
11.75	2.06	1.14	0.41			
12.00	2.89	1.89	1.04			
12.25	3.73	2.67	0.78			
12.50	4.06	2.98	0.36			
12.75	4.22	3.13	0.19			
13.00	4.34	3.25	0.15			
13.25	4.44	3.34	0.12			
13.50	4.54	3.43	0.11			
13.75	4.62	3.51	0.10			
14.00	4.70	3.58	0.09			
14.25	4.76	3.65	0.09			
14.50	4.83	3.71	0.08			

Page 29

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

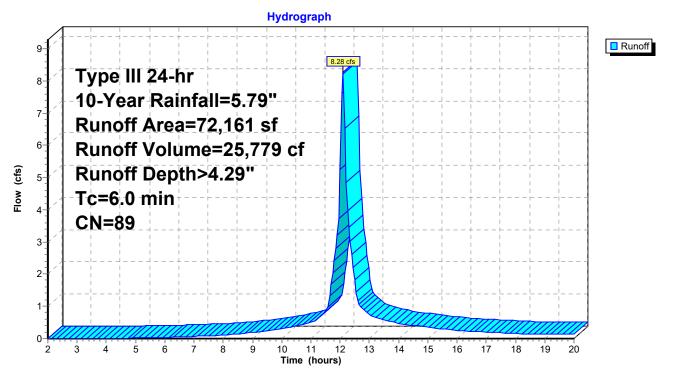
Summary for Subcatchment DA-3a: DA-3a

Runoff = 8.28 cfs @ 12.09 hrs, Volume= 25,779 cf, Depth> 4.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=5.79"

A	rea (sf)	CN	Description						
	11,338	39	>75% Gras	>75% Grass cover, Good, HSG A					
	60,823	98	Paved park	ing, HSG A	<u> </u>				
	72,161	89	Weighted A	verage					
	11,338 15.71% Pervious Area								
	60,823		84.29% Imp	ervious Ar	ea				
Тс	3	Slope	,	Capacity	Description				
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)					
6.0					Direct Entry.				

Subcatchment DA-3a: DA-3a



Runoff

(cfs)

0.38

0.36 0.33

0.30 0.28

0.25 0.23

0.22

0.21

0.20 0.19

0.18

0.16

0.15

0.15

0.14

0.14

0.14

0.13

0.13 0.13

0.12

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 30

Hydrograph for Subcatchment DA-3a: DA-3a

			, ,	-		
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)
2.00	0.12	0.00	0.00	14.75	4.89	3.67
2.25	0.12	0.00	0.00	15.00	4.95	3.72
2.50	0.15	0.00	0.00	15.25	5.00	3.72
2.75	0.15	0.00	0.00	15.25	5.05	3.77
				1		
3.00 3.25	0.18 0.19	0.00	0.00 0.00	15.75 16.00	5.09 5.13	3.86 3.90
3.50	0.19	0.00	0.00	16.25	5.13	3.93
3.75	0.21	0.00	0.00	16.23	5.17	3.93
4.00	0.25	0.00	0.00	16.75	5.23	4.00
4.25	0.23	0.00	0.00	17.00	5.27	4.03
4.50	0.27	0.00	0.01	17.25	5.30	4.06
4.75	0.23	0.00	0.01	17.50	5.32	4.08
5.00	0.33	0.01	0.02	17.75	5.35	4.11
5.25	0.35	0.01	0.02	18.00	5.37	4.13
5.50	0.37	0.01	0.02	18.25	5.40	4.15
5.75	0.39	0.02	0.03	18.50	5.42	4.17
6.00	0.42	0.02	0.03	18.75	5.44	4.19
6.25	0.44	0.03	0.04	19.00	5.46	4.22
6.50	0.47	0.03	0.05	19.25	5.48	4.24
6.75	0.49	0.04	0.06	19.50	5.50	4.25
7.00	0.52	0.05	0.06	19.75	5.52	4.27
7.25	0.56	0.06	0.07	20.00	5.54	4.29
7.50	0.59	0.07	0.08			
7.75	0.62	0.09	0.09			
8.00	0.66	0.10	0.11			
8.25	0.70	0.12	0.12			
8.50	0.74	0.14	0.14			
8.75	0.79	0.17	0.16			
9.00	0.84	0.19	0.19			
9.25	0.90	0.23	0.21			
9.50	0.96	0.26	0.24			
9.75 10.00	1.03 1.09	0.30 0.34	0.27 0.30			
10.00	1.17	0.34	0.30			
10.50	1.25	0.45	0.39			
10.75	1.35	0.52	0.45			
11.00	1.45	0.59	0.50			
11.25	1.57	0.68	0.64			
11.50	1.73	0.81	0.84			
11.75	2.06	1.08	2.04			
12.00	2.89	1.81	5.25			
12.25	3.73	2.57	3.97			
12.50	4.06	2.88	1.82			
12.75	4.22	3.03	0.95			
13.00	4.34	3.15	0.75			
13.25	4.44	3.24	0.63			
13.50	4.54	3.33	0.58			
13.75	4.62	3.41	0.53			
14.00	4.70	3.48	0.47			
14.25	4.76	3.55	0.44			
14.50	4.83	3.61	0.41	1		

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 31

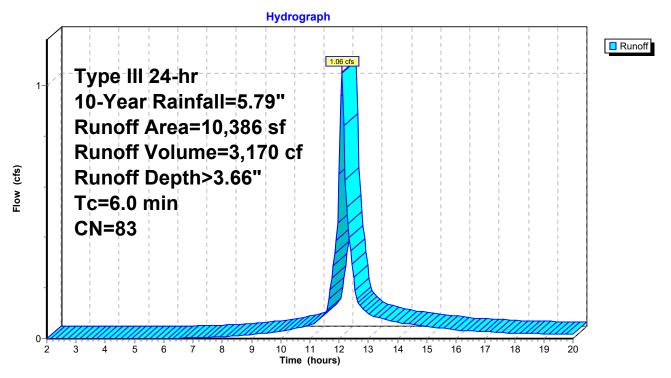
Summary for Subcatchment DA-3b: DA-3b

Runoff = 1.06 cfs @ 12.09 hrs, Volume= 3,170 cf, Depth> 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=5.79"

_	Aı	rea (sf)	CN	Description				
		2,618	39	>75% Gras	s cover, Go	Good, HSG A		
_		7,768	98	Paved park	Paved parking, HSG A			
		10,386	83	83 Weighted Average				
		2,618		25.21% Pervious Area				
		7,768		74.79% Imp	pervious Ar	rea		
	_		01	.	0 ''	D		
	Tc	Length	Slope	,	Capacity	•		
_	(min)	(feet)	(ft/ft) (ft/sec)	(cfs)			
	6.0					Direct Entry.		

Subcatchment DA-3b: DA-3b



Runoff (cfs) 0.05 0.05 0.04 0.04 0.04 0.03 0.03 0.03 0.03 0.03 0.03 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 32

Hydrograph for Subcatchment DA-3b: DA-3b

			, 9			
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00	0.12	0.00	0.00	14.75	4.89	3.07
2.25	0.13	0.00	0.00	15.00	4.95	3.13
2.50	0.15	0.00	0.00	15.25	5.00	3.17
2.75	0.16	0.00	0.00	15.50	5.05	3.22
3.00	0.18	0.00	0.00	15.75	5.09	3.26
3.25 3.50	0.19 0.21	0.00 0.00	0.00 0.00	16.00 16.25	5.13 5.17	3.29 3.33
3.75	0.21	0.00	0.00	16.25	5.17	3.36
4.00	0.25	0.00	0.00	16.75	5.23	3.39
4.25	0.27	0.00	0.00	17.00	5.27	3.42
4.50	0.29	0.00	0.00	17.25	5.30	3.44
4.75	0.31	0.00	0.00	17.50	5.32	3.47
5.00	0.33	0.00	0.00	17.75	5.35	3.49
5.25	0.35	0.00	0.00	18.00	5.37	3.51
5.50	0.37	0.00	0.00	18.25	5.40	3.53
5.75	0.39	0.00	0.00	18.50	5.42	3.55
6.00 6.25	0.42	0.00	0.00	18.75 19.00	5.44	3.57
6.50	0.44 0.47	0.00 0.00	0.00 0.00	19.00	5.46 5.48	3.59 3.61
6.75	0.49	0.00	0.00	19.50	5.50	3.63
7.00	0.52	0.01	0.00	19.75	5.52	3.65
7.25	0.56	0.01	0.00	20.00	5.54	3.67
7.50	0.59	0.01	0.00			
7.75	0.62	0.02	0.01			
8.00	0.66	0.03	0.01			
8.25	0.70	0.04	0.01			
8.50 8.75	0.74 0.79	0.05 0.06	0.01 0.01			
9.00	0.79	0.08	0.01			
9.25	0.90	0.09	0.02			
9.50	0.96	0.12	0.02			
9.75	1.03	0.14	0.02			
10.00	1.09	0.17	0.03			
10.25	1.17	0.21	0.03			
10.50	1.25	0.25	0.04			
10.75	1.35	0.29	0.05			
11.00 11.25	1.45 1.57	0.35 0.42	0.05 0.07			
11.50	1.73	0.42	0.07			
11.75	2.06	0.73	0.24			
12.00	2.89	1.36	0.65			
12.25	3.73	2.06	0.52			
12.50	4.06	2.34	0.24			
12.75	4.22	2.48	0.13			
13.00	4.34	2.59	0.10			
13.25	4.44	2.68	0.09			
13.50 13.75	4.54 4.62	2.76 2.83	0.08 0.07			
14.00	4.62	2.63 2.90	0.07			
14.25	4.76	2.96	0.06			
			2:22			

3.02

0.06

4.83

14.50

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 33

Summary for Pond DET-1: Underground Detention System

Inflow Area = 72,161 sf, 84.29% Impervious, Inflow Depth > 4.29" for 10-Year event

Inflow = 8.28 cfs @ 12.09 hrs, Volume= 25,779 cf

Outflow = 2.47 cfs @ 12.42 hrs, Volume= 24,921 cf, Atten= 70%, Lag= 19.7 min

Primary = 2.47 cfs @ 12.42 hrs, Volume= 24,921 cf

Routing by Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 62.56' @ 12.42 hrs Surf.Area= 4,480 sf Storage= 8,361 cf

Plug-Flow detention time= 56.7 min calculated for 24,921 cf (97% of inflow) Center-of-Mass det. time= 43.5 min (802.7 - 759.3)

Volume	Invert	Avail.Storage	Storage Description
#1	60.60'	7,672 cf	Oldcastle StormCapture SC1 3'x 24
			Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
			Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf
			4 Rows adjusted for 32.0 cf perimeter wall
#2	60.60'	5,112 cf	Oldcastle StormCapture SC1 3'x 16
			Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
			Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf
			4 Rows adjusted for 24.0 cf perimeter wall
		40.704.5	T () A () 1 0 (

12,784 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	64.18'	Automatic Storage Overflow (Discharged without head)
#1	Primary	60.60'	12.0" Round Culvert
			L= 100.0' CMP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 60.60' / 59.40' S= 0.0120 '/' Cc= 0.900
			n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	60.60'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600
			Limited to weir flow at low heads
#3	Device 1	62.60'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.47 cfs @ 12.42 hrs HW=62.56' (Free Discharge)

1=Culvert (Passes 2.47 cfs of 3.61 cfs potential flow)

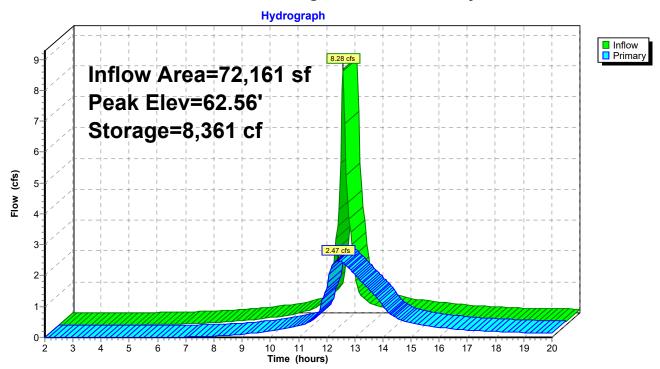
2=Orifice/Grate (Orifice Controls 2.47 cfs @ 6.30 fps)

3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

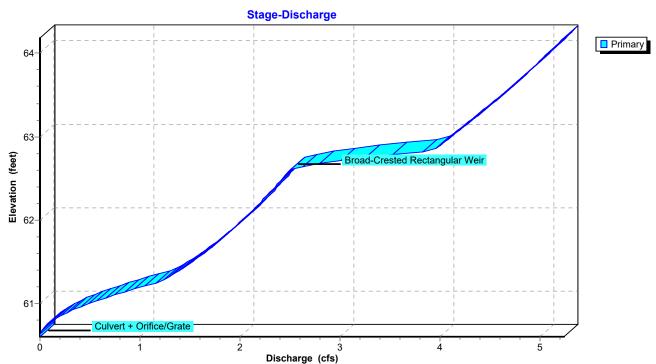
Page 34

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Pond DET-1: Underground Detention System



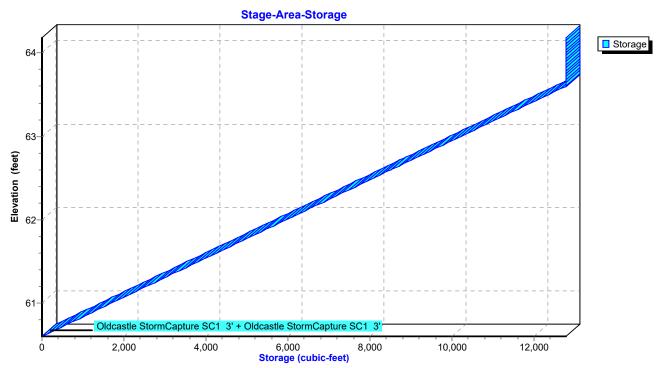
Pond DET-1: Underground Detention System



Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 35

Pond DET-1: Underground Detention System



Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 36

Hydrograph for Pond DET-1: Underground Detention System

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
2.00	0.00	(cubic-leet) 0	60.60	0.00
2.50	0.00	0	60.60	0.00
3.00	0.00	Ö	60.60	0.00
3.50	0.00	Ö	60.60	0.00
4.00	0.00	0	60.60	0.00
4.50	0.01	5	60.60	0.00
5.00	0.02	24	60.61	0.00
5.50	0.02	57	60.61	0.00
6.00	0.03	105	60.62	0.00
6.50	0.05	169	60.64	0.01
7.00	0.06	251	60.66	0.01
7.50	0.08	351	60.68	0.02
8.00	0.11	463	60.71	0.04
8.50	0.14	588	60.74	0.07
9.00	0.19	736	60.77	0.10
9.50	0.24	897	60.81	0.15
10.00	0.30	1,061	60.85	0.21
10.50	0.39	1,243	60.89	0.28
11.00	0.50	1,462	60.94	0.38
11.50	0.84	1,815	61.03	0.56
12.00	5.25	4,071	61.56	1.59
12.50	1.82	8,265	62.54	2.46
13.00 13.50	0.75 0.58	6,043	62.02 61.53	2.04 1.56
14.00	0.36 0.47	3,958 2,541	61.20	1.01
14.50	0.47	1,920	61.05	0.62
15.00	0.41	1,647	60.99	0.02
15.50	0.30	1,479	60.95	0.38
16.00	0.25	1,345	60.92	0.32
16.50	0.22	1,235	60.89	0.27
17.00	0.20	1,153	60.87	0.24
17.50	0.18	1,083	60.85	0.21
18.00	0.15	1,017	60.84	0.19
18.50	0.14	960	60.83	0.17
19.00	0.14	919	60.82	0.16
19.50	0.13	888	60.81	0.15
20.00	0.12	859	60.80	0.14

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 37

Summary for Link POA-1: Mill Brook

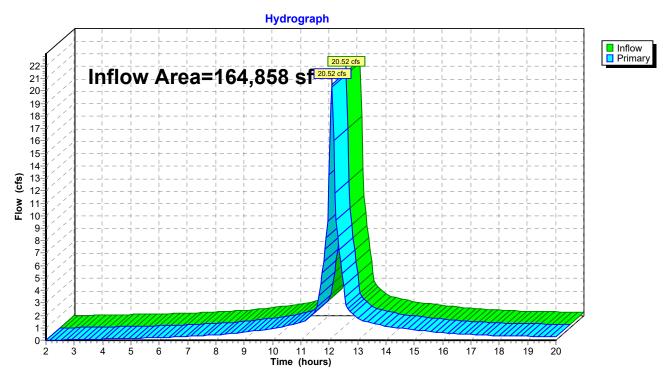
Inflow Area = 164,858 sf, 94.89% Impervious, Inflow Depth > 4.95" for 10-Year event

Inflow = 20.52 cfs @ 12.09 hrs, Volume= 68,015 cf

Primary = 20.52 cfs @ 12.09 hrs, Volume= 68,015 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-1: Mill Brook



Primary (cfs) 0.91 0.84 0.78 0.72 0.66 0.59 0.55 0.52 0.50 0.47 0.44 0.42 0.39 0.36 0.35 0.34 0.33 0.32 0.31 0.30 0.30 0.29

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 38

Hydrograph for Link POA-1: Mill Brook

			,,			
Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.00	0.00	0.00	14.75	0.91	0.00
2.25	0.02	0.00	0.02	15.00	0.84	0.00
2.50	0.03	0.00	0.03	15.25	0.78	0.00
2.75	0.04	0.00	0.04	15.50	0.72	0.00
3.00	0.05	0.00	0.05	15.75	0.66	0.00
3.25	0.07	0.00	0.07	16.00	0.59	0.00
3.50	0.08	0.00	0.08	16.25	0.55	0.00
3.75	0.09	0.00	0.09	16.50	0.52	0.00
4.00	0.11	0.00	0.11	16.75	0.50	0.00
4.25	0.12	0.00	0.12	17.00	0.47	0.00
4.50	0.13	0.00	0.13	17.25	0.44	0.00
4.75	0.14	0.00	0.14	17.50	0.42	0.00
5.00	0.16	0.00	0.16	17.75	0.39	0.00
5.25	0.17	0.00	0.17	18.00	0.36	0.00
5.50 5.75	0.18	0.00	0.18	18.25	0.35 0.34	0.00 0.00
5.75 6.00	0.20 0.21	0.00 0.00	0.20 0.21	18.50 18.75	0.34	0.00
6.25	0.21	0.00	0.21	19.00	0.33	0.00
6.50	0.26	0.00	0.26	19.25	0.32	0.00
6.75	0.28	0.00	0.28	19.50	0.30	0.00
7.00	0.20	0.00	0.31	19.75	0.30	0.00
7.25	0.34	0.00	0.34	20.00	0.29	0.00
7.50	0.37	0.00	0.37	20.00	0.20	0.00
7.75	0.40	0.00	0.40			
8.00	0.43	0.00	0.43			
8.25	0.48	0.00	0.48			
8.50	0.54	0.00	0.54			
8.75	0.60	0.00	0.60			
9.00	0.66	0.00	0.66			
9.25	0.73	0.00	0.73			
9.50	0.79	0.00	0.79			
9.75	0.86	0.00	0.86			
10.00	0.93	0.00	0.93			
10.25	1.03	0.00	1.03			
10.50	1.17	0.00	1.17			
10.75	1.30	0.00	1.30			
11.00	1.43	0.00	1.43			
11.25	1.79	0.00	1.79			
11.50	2.29	0.00	2.29			
11.75	5.40	0.00	5.40 13.27			
12.00 12.25	13.27 9.64	0.00 0.00	9.64			
12.25	4.37	0.00	4.37			
12.75	2.28	0.00	2.28			
13.00	1.78	0.00	1.78			
13.25	1.51	0.00	1.51			
13.50	1.38	0.00	1.38			
13.75	1.25	0.00	1.25			
14.00	1.12	0.00	1.12			
14.25	1.03	0.00	1.03			
14.50	0.97	0.00	0.97			
				i		

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 39

Summary for Link POA-2: Grove Street

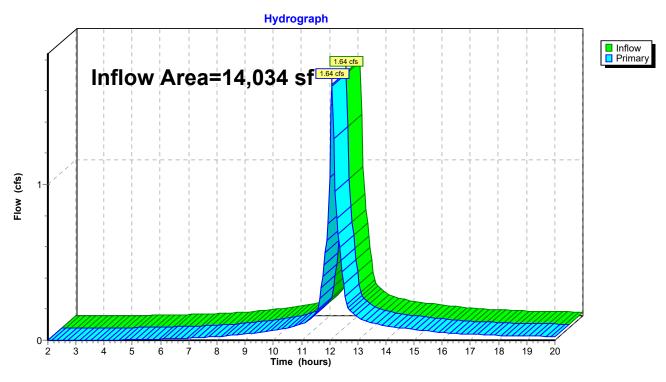
Inflow Area = 14,034 sf, 87.20% Impervious, Inflow Depth > 4.39" for 10-Year event

Inflow = 1.64 cfs @ 12.09 hrs, Volume= 5,140 cf

Primary = 1.64 cfs @ 12.09 hrs, Volume= 5,140 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-2: Grove Street



Primary (cfs) 0.08 0.07 0.06 0.06 0.05 0.05 0.05 0.04 0.04 0.04 0.04 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.02 0.02

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 40

Hydrograph for Link POA-2: Grove Street

Time (hours) Inflow (cfs) Elevation (feet) Primary (cfs) Time (hours) Inflow (cfs) Elevation (feet) 2.00 0.00 0.00 0.00 14.75 0.08 0.00 2.25 0.00 0.00 0.00 15.00 0.07 0.00 2.50 0.00 0.00 0.00 15.25 0.06 0.00 3.00 0.00 0.00 0.00 15.75 0.05 0.00 3.25 0.00 0.00 0.00 16.25 0.05 0.00 3.75 0.00 0.00 0.00 16.25 0.05 0.00 4.25 0.00 0.00 0.00 16.75 0.04 0.00 4.25 0.00 0.00 0.00 17.20 0.04 0.00 4.25 0.00 0.00 0.00 17.50 0.03 0.00 4.25 0.00 0.00 0.00 17.50 0.03 0.00 4.75 0.00 0							
2.00 0.00 0.00 0.00 14,75 0.08 0.00 2.255 0.00 0.00 0.00 15.00 0.07 0.00 2.75 0.00 0.00 0.00 15.25 0.06 0.00 3.00 0.00 0.00 0.00 15.75 0.05 0.00 3.00 0.00 0.00 0.00 16.00 0.05 0.00 3.50 0.00 0.00 0.00 16.50 0.04 0.00 4.00 0.00 0.00 0.00 16.50 0.04 0.00 4.25 0.00 0.00 0.00 17.00 0.04 0.00 4.75 0.00 0.00 0.00 17.25 0.04 0.00 4.75 0.00 0.00 0.00 17.75 0.04 0.00 5.25 0.01 0.00 0.00 17.75 0.03 0.00 5.25 0.01 0.00 0.01 18.25 <							
2.25							
2.50							
2.75							
3.00 0.00 0.00 0.00 15.75 0.05 0.00 3.25 0.00 0.00 0.00 16.00 0.05 0.00 3.50 0.00 0.00 0.00 16.25 0.05 0.00 3.75 0.00 0.00 0.00 16.55 0.00 16.50 0.00 4.00 0.00 0.00 16.55 0.00 16.55 0.00 4.00 0.00 0.00 16.75 0.04 0.00 4.25 0.00 0.00 0.00 17.00 0.04 0.00 4.50 0.00 0.00 0.00 17.00 0.04 0.00 4.75 0.00 0.00 0.00 17.25 0.04 0.00 4.75 0.00 0.00 0.00 17.55 0.03 0.00 5.00 0.00 0.00 17.55 0.03 0.00 5.25 0.01 0.00 0.00 17.75 0.03 0.00 5.55 0.01 0.00 0.01 18.50 0.03 0.00 5.75 0.01 0.00 0.01 18.50 0.03 0.00 6.00 0.01 18.50 0.03 0.00 6.25 0.01 0.00 0.01 18.50 0.03 0.00 6.25 0.01 0.00 0.01 18.50 0.03 0.00 6.25 0.01 0.00 0.01 19.25 0.03 0.00 6.75 0.01 0.00 0.01 19.25 0.03 0.00 6.75 0.01 0.00 0.01 19.25 0.03 0.00 6.75 0.01 0.00 0.01 19.25 0.03 0.00 6.75 0.01 0.00 0.01 19.25 0.03 0.00 6.75 0.01 0.00 0.01 19.50 0.03 0.00 6.75 0.01 0.00 0.01 19.50 0.03 0.00 6.75 0.01 0.00 0.01 19.50 0.03 0.00 6.75 0.01 0.00 0.01 19.50 0.03 0.00 6.75 0.02 0.00 0.03 0.00 0.03 0.00 0.05 0.05 0.00 0.00 0.05 0.00 0.05 0.00 0.05 0.00 0.00 0.05 0.00 0.00 0.05 0.00 0.00 0.05 0.00 0.00 0.05 0.0							
3.25							
3.50							
3.75 0.00 0.00 0.00 16.50 0.04 0.00 4.00 0.00 0.00 0.00 16.75 0.04 0.00 4.25 0.00 0.00 0.00 17.00 0.04 0.00 4.50 0.00 0.00 0.00 17.25 0.04 0.00 4.75 0.00 0.00 0.00 17.75 0.03 0.00 5.00 0.01 0.00 0.00 17.75 0.03 0.00 5.25 0.01 0.00 0.01 18.00 0.03 0.00 5.75 0.01 0.00 0.01 18.50 0.03 0.00 6.00 0.01 0.00 0.01 18.75 0.03 0.00 6.25 0.01 0.00 0.01 18.75 0.03 0.00 6.75 0.01 0.00 0.01 19.50 0.03 0.00 7.25 0.02 0.00 0.02 2 0.							
4.00 0.00 0.00 0.00 16.75 0.04 0.00 4.25 0.00 0.00 0.00 17.00 0.04 0.00 4.50 0.00 0.00 0.00 17.25 0.04 0.00 4.75 0.00 0.00 0.00 17.50 0.03 0.00 5.00 0.01 0.00 0.01 18.00 0.03 0.00 5.25 0.01 0.00 0.01 18.00 0.03 0.00 5.50 0.01 0.00 0.01 18.50 0.03 0.00 5.75 0.01 0.00 0.01 18.50 0.03 0.00 6.00 0.01 0.00 0.01 18.75 0.03 0.00 6.25 0.01 0.00 0.01 19.00 0.03 0.00 6.75 0.01 0.00 0.01 19.25 0.03 0.00 6.75 0.01 0.00 0.01 19.50 0.03 0.00 7.25 0.02 0.00 0.02 20.00							
4.25 0.00 0.00 0.00 17.00 0.04 0.00 4.50 0.00 0.00 0.00 17.25 0.04 0.00 4.75 0.00 0.00 0.00 17.50 0.03 0.00 5.00 0.00 0.00 0.00 17.75 0.03 0.00 5.25 0.01 0.00 0.01 18.00 0.03 0.00 5.50 0.01 0.00 0.01 18.50 0.03 0.00 6.00 0.01 0.00 0.01 18.75 0.03 0.00 6.25 0.01 0.00 0.01 18.75 0.03 0.00 6.25 0.01 0.00 0.01 19.00 0.03 0.00 6.75 0.01 0.00 0.01 19.25 0.03 0.00 6.75 0.01 0.00 0.01 19.75 0.02 0.00 7.25 0.02 0.00 0.02 20.00 0.02 0.00 7.50 0.02 0.00 0.02 20.00							
4.50 0.00 0.00 0.00 17.25 0.04 0.00 4.75 0.00 0.00 0.00 17.50 0.03 0.00 5.00 0.00 0.00 0.00 17.75 0.03 0.00 5.25 0.01 0.00 0.01 18.00 0.03 0.00 5.50 0.01 0.00 0.01 18.25 0.03 0.00 5.75 0.01 0.00 0.01 18.50 0.03 0.00 6.00 0.01 0.00 0.01 18.50 0.03 0.00 6.25 0.01 0.00 0.01 19.00 0.03 0.00 6.75 0.01 0.00 0.01 19.25 0.03 0.00 6.75 0.01 0.00 0.01 19.50 0.03 0.00 7.50 0.02 0.00 0.02 20.00 0.02 0.00 7.50 0.02 0.00 0.02 20.00 0.02 0.00 0.02 8.25 0.03 0.00 0.03 8.75							
4.75 0.00 0.00 0.00 17.50 0.03 0.00 5.00 0.00 0.00 17.75 0.03 0.00 5.25 0.01 0.00 0.01 18.00 0.03 0.00 5.50 0.01 0.00 0.01 18.50 0.03 0.00 6.75 0.01 0.00 0.01 18.75 0.03 0.00 6.25 0.01 0.00 0.01 19.00 0.03 0.00 6.50 0.01 0.00 0.01 19.00 0.03 0.00 6.75 0.01 0.00 0.01 19.50 0.03 0.00 6.75 0.01 0.00 0.01 19.75 0.02 0.00 7.00 0.01 0.00 0.01 19.75 0.02 0.00 7.50 0.02 0.00 0.02 20.00 0.02 20.00 0.02 8.00 0.02 0.00 0.02 20.00 0.02 20.00 0.02 20.00 0.02 20.00 0.02 20.00							
5.00 0.00 0.00 17.75 0.03 0.00 5.25 0.01 0.00 0.01 18.00 0.03 0.00 5.50 0.01 0.00 0.01 18.25 0.03 0.00 5.75 0.01 0.00 0.01 18.50 0.03 0.00 6.00 0.01 0.00 0.01 18.75 0.03 0.00 6.25 0.01 0.00 0.01 19.00 0.03 0.00 6.50 0.01 0.00 0.01 19.25 0.03 0.00 6.75 0.01 0.00 0.01 19.25 0.03 0.00 7.00 0.01 0.00 0.01 19.75 0.02 0.00 7.25 0.02 0.00 0.02 20.00 0.02 20.00 0.02 7.75 0.02 0.00 0.02 20.00 0.02 20.00 0.02 20.00 0.02 20.00 0.02 20.00							
5.25 0.01 0.00 0.01 18.00 0.03 0.00 5.50 0.01 0.00 0.01 18.25 0.03 0.00 6.00 0.01 0.00 0.01 18.50 0.03 0.00 6.00 0.01 0.00 0.01 18.75 0.03 0.00 6.25 0.01 0.00 0.01 19.00 0.03 0.00 6.50 0.01 0.00 0.01 19.25 0.03 0.00 6.75 0.01 0.00 0.01 19.50 0.03 0.00 7.00 0.01 0.00 0.01 19.55 0.03 0.00 7.25 0.02 0.00 0.01 19.75 0.02 0.00 7.50 0.02 0.00 0.02 2.00 0.02 2.00 0.02 8.00 0.02 0.00 0.02 8.25 0.03 0.00 0.03 8.50 0.03 0.00 0.04 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>							
5.50 0.01 0.00 0.01 18.25 0.03 0.00 5.75 0.01 0.00 0.01 18.50 0.03 0.00 6.00 0.01 0.00 0.01 18.75 0.03 0.00 6.25 0.01 0.00 0.01 19.00 0.03 0.00 6.50 0.01 0.00 0.01 19.25 0.03 0.00 6.75 0.01 0.00 0.01 19.50 0.03 0.00 7.00 0.01 0.00 0.01 19.50 0.03 0.00 7.25 0.02 0.00 0.01 19.50 0.03 0.00 7.25 0.02 0.00 0.02 20.00 0.02 0.00 7.75 0.02 0.00 0.02 20.00 0.02 0.00 8.25 0.03 0.00 0.03 8.75 0.03 0.00 0.04 9.25 0.04 0.00 0.04							
5.75 0.01 0.00 0.01 18.50 0.03 0.00 6.00 0.01 0.00 0.01 18.75 0.03 0.00 6.25 0.01 0.00 0.01 19.00 0.03 0.00 6.50 0.01 0.00 0.01 19.00 0.03 0.00 6.75 0.01 0.00 0.01 19.50 0.03 0.00 7.00 0.01 0.00 0.01 19.50 0.03 0.00 7.25 0.02 0.00 0.02 20.00 0.02 0.00 7.75 0.02 0.00 0.02 20.00 0.02 0.00 8.00 0.02 0.00 0.02 8.25 0.03 0.00 0.03 8.50 0.03 0.00 0.03 8.50 0.03 0.00 0.04 9.25 0.04 0.00 0.04 9.50 0.05 0.00 0.06 10.00 0.06 0							
6.00							
6.25 0.01 0.00 0.01 19.00 0.03 0.00 6.50 0.01 0.00 0.01 19.25 0.03 0.00 6.75 0.01 0.00 0.01 19.50 0.03 0.00 7.00 0.01 0.00 0.01 19.75 0.02 0.00 7.25 0.02 0.00 0.02 20.00 0.02 0.00 7.50 0.02 0.00 0.02 20.00 0.02 0.00 8.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 8.25 0.03 0.00 0.03 0.03 0.00 0.03 0.00 0.03 0.00 0.03 0.00 0.04 9.25 0.04 0.00 0.04 9.25 0.04 0.00 0.04 9.25 0.04 0.00 0.06 0.00 0.06 0.00 0.06 0.00 0.06 0.00 0.06 0.00 0.08 0.00							
6.50 0.01 0.00 0.01 19.25 0.03 0.00 6.75 0.01 0.00 0.01 19.50 0.03 0.00 7.00 0.01 0.00 0.01 19.75 0.02 0.00 7.25 0.02 0.00 0.02 20.00 0.02 0.00 7.50 0.02 0.00 0.02 20.00 0.02 0.00 7.75 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.00 0.03 0.00 0.03 0.00 0.03 8.50 0.03 0.00 0.03 8.50 0.03 0.00 0.03 9.00 0.04 9.25 0.04 0.00 0.04 9.25 0.04 0.00 0.06 10.02 0.06 10.00 0.06 10.02 0.00 10.06 10.00 10.00 10.							
6.75 0.01 0.00 0.01 19.50 0.03 0.00 7.00 0.01 0.00 0.01 19.75 0.02 0.00 7.25 0.02 0.00 0.02 20.00 0.02 0.00 7.50 0.02 0.00 0.02 20.00 0.02 0.00 7.75 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.03 0.00 0.03 0.00 0.03 0.00 0.03 0.00 0.03 0.00 0.03 0.00 0.04 9.25 0.04 0.00 0.06 0.00 0.06 0.00 0.06 0.00 0.06 0.00 0.06 0.00 0.06 0.00 0.00 0.00 0.00 0.00 0.00 0.00 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>							
7.00 0.01 0.00 0.01 19.75 0.02 0.00 7.25 0.02 0.00 0.02 20.00 0.02 0.00 7.50 0.02 0.00 0.02 20.00 0.02 0.00 8.00 0.02 0.00 0.02 0.02 0.00 0.02 8.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 8.25 0.03 0.00 0.03 0.00 0.03 0.00 0.03 9.00 0.04 0.00 0.04 9.25 0.04 0.00 0.04 9.25 0.04 0.00 0.04 9.25 0.04 0.00 0.06 10.00 0.06 10.00 0.06 10.00 0.06 10.00 0.06 10.00 0.06 10.00 0.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00							
7.25 0.02 0.00 0.02 20.00 0.02 0.00 7.50 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.02 0.00 0.03 0.00 0.03 0.00 0.03 0.00 0.03 0.00 0.03 0.00 0.03 9.00 0.04 0.00 0.04 9.25 0.04 0.00 0.04 9.25 0.04 0.00 0.06 10.00 0.05 9.75 0.06 0.00 0.06 10.00 0.06 10.00 0.06 10.00 0.06 10.00 0.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00							
7.50 0.02 0.00 0.02 7.75 0.02 0.00 0.02 8.00 0.02 0.00 0.02 8.25 0.03 0.00 0.03 8.50 0.03 0.00 0.03 8.75 0.03 0.00 0.03 9.00 0.04 0.00 0.04 9.25 0.04 0.00 0.04 9.50 0.05 0.00 0.05 9.75 0.06 0.00 0.06 10.00 0.06 0.00 0.06 10.25 0.07 0.00 0.07 10.50 0.08 0.00 0.08 10.75 0.09 0.00 0.09 11.00 0.10 0.00 0.10 11.25 0.13 0.00 0.17 11.75 0.41 0.00 0.17 12.20 1.04 0.00 0.78 12.50 0.36 0.00 0.78 12.50 0.36 0.00 0.15 13.25 0.12							
7.75 0.02 0.00 0.02 8.00 0.02 0.00 0.02 8.25 0.03 0.00 0.03 8.50 0.03 0.00 0.03 8.75 0.03 0.00 0.03 9.00 0.04 0.00 0.04 9.25 0.04 0.00 0.05 9.75 0.06 0.00 0.06 10.00 0.06 0.00 0.06 10.25 0.07 0.00 0.07 10.50 0.08 0.00 0.08 10.75 0.09 0.00 0.09 11.00 0.10 0.00 0.13 11.55 0.17 0.00 0.17 11.75 0.41 0.00 0.41 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.15 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.10 14.00 0.					20.00	0.02	0.00
8.00 0.02 0.00 0.02 8.25 0.03 0.00 0.03 8.50 0.03 0.00 0.03 8.75 0.03 0.00 0.03 9.00 0.04 0.00 0.04 9.25 0.04 0.00 0.04 9.50 0.05 0.00 0.06 10.00 0.06 0.00 0.06 10.02 0.07 0.00 0.07 10.50 0.08 0.00 0.08 10.75 0.09 0.00 0.09 11.00 0.10 0.00 0.13 11.55 0.13 0.00 0.17 11.75 0.41 0.00 0.41 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.15 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.11 13.50 0.11 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0							
8.25 0.03 0.00 0.03 8.50 0.03 0.00 0.03 8.75 0.03 0.00 0.04 9.00 0.04 0.00 0.04 9.25 0.04 0.00 0.05 9.75 0.06 0.00 0.06 10.00 0.06 0.00 0.06 10.25 0.07 0.00 0.07 10.50 0.08 0.00 0.08 10.75 0.09 0.00 0.09 11.00 0.10 0.00 0.13 11.55 0.13 0.00 0.17 11.75 0.41 0.00 0.41 12.20 1.04 0.00 1.04 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.15 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.10 14.00 0.09 0.00 0.09 14.25							
8.50 0.03 0.00 0.03 8.75 0.03 0.00 0.03 9.00 0.04 0.00 0.04 9.25 0.04 0.00 0.05 9.75 0.06 0.00 0.06 10.00 0.06 0.00 0.06 10.25 0.07 0.00 0.07 10.50 0.08 0.00 0.08 10.75 0.09 0.00 0.09 11.00 0.10 0.00 0.10 11.25 0.13 0.00 0.13 11.50 0.17 0.00 0.17 11.75 0.41 0.00 0.41 12.20 1.04 0.00 1.04 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.15 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.10 14.00 0.09 0.00 0.09 14.25 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>							
8.75 0.03 0.00 0.03 9.00 0.04 0.00 0.04 9.25 0.04 0.00 0.04 9.50 0.05 0.00 0.05 9.75 0.06 0.00 0.06 10.00 0.06 0.00 0.06 10.25 0.07 0.00 0.07 10.50 0.08 0.00 0.08 10.75 0.09 0.00 0.09 11.00 0.10 0.00 0.10 11.25 0.13 0.00 0.17 11.75 0.41 0.00 0.41 12.20 1.04 0.00 1.04 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.15 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
9.25 0.04 0.00 0.04 9.50 0.05 0.00 0.05 9.75 0.06 0.00 0.06 10.00 0.06 0.00 0.06 10.25 0.07 0.00 0.07 10.50 0.08 0.00 0.08 10.75 0.09 0.00 0.09 11.00 0.10 0.00 0.10 11.25 0.13 0.00 0.13 11.50 0.17 0.00 0.17 11.75 0.41 0.00 0.41 12.00 1.04 0.00 1.04 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.36 12.75 0.19 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.09 14.00 0.09 0.00 0.09	8.75	0.03	0.00	0.03			
9.50 0.05 0.00 0.05 9.75 0.06 0.00 0.06 10.00 0.06 0.00 0.06 10.25 0.07 0.00 0.07 10.50 0.08 0.00 0.08 10.75 0.09 0.00 0.09 11.00 0.10 0.00 0.10 11.25 0.13 0.00 0.13 11.50 0.17 0.00 0.17 11.75 0.41 0.00 0.41 12.00 1.04 0.00 1.04 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.36 12.75 0.19 0.00 0.15 13.00 0.15 0.00 0.15 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.00 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09	9.00	0.04	0.00	0.04			
9.75 0.06 0.00 0.06 10.00 0.06 0.00 0.06 10.25 0.07 0.00 0.07 10.50 0.08 0.00 0.08 10.75 0.09 0.00 0.09 11.00 0.10 0.00 0.10 11.25 0.13 0.00 0.13 11.50 0.17 0.00 0.17 11.75 0.41 0.00 0.41 12.00 1.04 0.00 1.04 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.36 12.75 0.19 0.00 0.19 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09	9.25	0.04	0.00	0.04			
10.00 0.06 0.00 0.06 10.25 0.07 0.00 0.07 10.50 0.08 0.00 0.08 10.75 0.09 0.00 0.09 11.00 0.10 0.00 0.10 11.25 0.13 0.00 0.13 11.50 0.17 0.00 0.17 11.75 0.41 0.00 0.41 12.00 1.04 0.00 1.04 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.36 12.75 0.19 0.00 0.19 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.09 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
10.25 0.07 0.00 0.07 10.50 0.08 0.00 0.08 10.75 0.09 0.00 0.09 11.00 0.10 0.00 0.10 11.25 0.13 0.00 0.13 11.50 0.17 0.00 0.17 11.75 0.41 0.00 0.41 12.00 1.04 0.00 1.04 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.36 12.75 0.19 0.00 0.15 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
10.50 0.08 0.00 0.08 10.75 0.09 0.00 0.09 11.00 0.10 0.00 0.10 11.25 0.13 0.00 0.13 11.50 0.17 0.00 0.17 11.75 0.41 0.00 0.41 12.00 1.04 0.00 1.04 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.36 12.75 0.19 0.00 0.19 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
10.75 0.09 0.00 0.09 11.00 0.10 0.00 0.10 11.25 0.13 0.00 0.13 11.50 0.17 0.00 0.17 11.75 0.41 0.00 0.41 12.00 1.04 0.00 1.04 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.36 12.75 0.19 0.00 0.19 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
11.00 0.10 0.00 0.10 11.25 0.13 0.00 0.13 11.50 0.17 0.00 0.17 11.75 0.41 0.00 0.41 12.00 1.04 0.00 1.04 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.36 12.75 0.19 0.00 0.19 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
11.25 0.13 0.00 0.13 11.50 0.17 0.00 0.17 11.75 0.41 0.00 0.41 12.00 1.04 0.00 1.04 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.36 12.75 0.19 0.00 0.19 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
11.50 0.17 0.00 0.17 11.75 0.41 0.00 0.41 12.00 1.04 0.00 1.04 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.36 12.75 0.19 0.00 0.19 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
11.75 0.41 0.00 0.41 12.00 1.04 0.00 1.04 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.36 12.75 0.19 0.00 0.19 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
12.00 1.04 0.00 1.04 12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.36 12.75 0.19 0.00 0.19 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
12.25 0.78 0.00 0.78 12.50 0.36 0.00 0.36 12.75 0.19 0.00 0.19 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
12.50 0.36 0.00 0.36 12.75 0.19 0.00 0.19 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
12.75 0.19 0.00 0.19 13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
13.00 0.15 0.00 0.15 13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
13.25 0.12 0.00 0.12 13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
13.50 0.11 0.00 0.11 13.75 0.10 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
13.75 0.10 0.00 0.10 14.00 0.09 0.00 0.09 14.25 0.09 0.00 0.09							
14.25 0.09 0.00 0.09	13.75	0.10	0.00				
14.50 0.08 0.00 0.08							
I	14.50	0.08	0.00	0.08			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 41

Summary for Link POA-3: Arlington High School

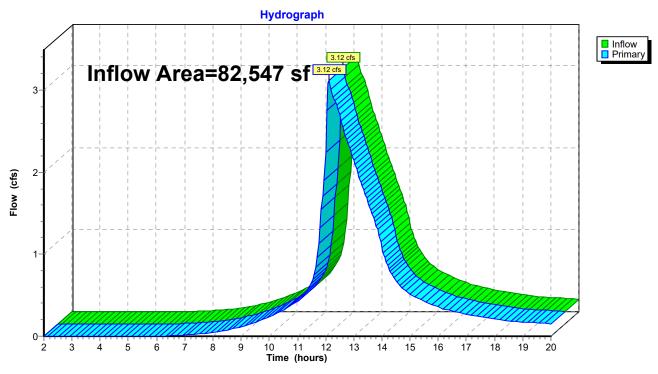
Inflow Area = 82,547 sf, 83.09% Impervious, Inflow Depth > 4.08" for 10-Year event

Inflow = 3.12 cfs @ 12.12 hrs, Volume= 28,091 cf

Primary = 3.12 cfs @ 12.12 hrs, Volume= 28,091 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-3: Arlington High School



Primary (cfs) 0.58 0.52 0.47 0.43 0.39 0.36 0.33 0.30 0.28 0.27 0.25 0.24 0.22 0.21 0.20 0.19 0.18 0.17 0.17 0.16 0.16 0.15

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 42

Hydrograph for Link POA-3: Arlington High School

		•	•		· ·	•
Time	Inflow (cfs)	Elevation	Primary	Time	Inflow	Elevation
(hours)		(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.00	0.00 0.00	0.00	14.75	0.58	0.00
2.25	0.00		0.00	15.00	0.52	0.00
2.50	0.00	0.00	0.00	15.25	0.47	0.00
2.75	0.00	0.00	0.00	15.50	0.43	0.00
3.00	0.00	0.00	0.00	15.75	0.39	0.00
3.25	0.00	0.00	0.00	16.00	0.36	0.00
3.50 3.75	0.00	0.00 0.00	0.00 0.00	16.25 16.50	0.33 0.30	0.00 0.00
4.00	0.00	0.00	0.00	16.75	0.30	0.00
4.00	0.00	0.00	0.00	17.00	0.28	0.00
4.25	0.00	0.00	0.00	17.00	0.27	0.00
4.75	0.00	0.00	0.00	17.50	0.23	0.00
5.00	0.00	0.00	0.00	17.75	0.24	0.00
5.25	0.00	0.00	0.00	18.00	0.22	0.00
5.50	0.00	0.00	0.00	18.25	0.21	0.00
5.75	0.00	0.00	0.00	18.50	0.20	0.00
6.00	0.00	0.00	0.00	18.75	0.18	0.00
6.25	0.00	0.00	0.00	19.00	0.17	0.00
6.50	0.01	0.00	0.01	19.25	0.17	0.00
6.75	0.01	0.00	0.01	19.50	0.16	0.00
7.00	0.02	0.00	0.02	19.75	0.16	0.00
7.25	0.02	0.00	0.02	20.00	0.15	0.00
7.50	0.03	0.00	0.03			
7.75	0.04	0.00	0.04			
8.00	0.05	0.00	0.05			
8.25	0.06	0.00	0.06			
8.50	0.08	0.00	0.08			
8.75	0.10	0.00	0.10			
9.00	0.12	0.00	0.12			
9.25	0.14	0.00	0.14			
9.50	0.17	0.00	0.17			
9.75	0.20	0.00	0.20			
10.00	0.23	0.00	0.23			
10.25	0.27	0.00	0.27			
10.50 10.75	0.32 0.37	0.00 0.00	0.32 0.37			
11.00	0.37	0.00	0.43			
11.25	0.43	0.00	0.43			
11.50	0.65	0.00	0.65			
11.75	1.13	0.00	1.13			
12.00	2.24	0.00	2.24			
12.25	2.92	0.00	2.92			
12.50	2.70	0.00	2.70			
12.75	2.40	0.00	2.40			
13.00	2.14	0.00	2.14			
13.25	1.88	0.00	1.88			
13.50	1.64	0.00	1.64			
13.75	1.40	0.00	1.40			
14.00	1.08	0.00	1.08			
14.25	0.82	0.00	0.82			
14.50	0.68	0.00	0.68			

Proposed Conditions - NOAA ++ Rainfall Type III 24-hr 25-Year Rainfall=7.49"

Prepared by Weston & Sampson

Printed 11/25/2020

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 43

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: DA-1 Runoff Area=164,858 sf 94.89% Impervious Runoff Depth>6.56"

Tc=6.0 min CN=95 Runoff=26.80 cfs 90,177 cf

SubcatchmentDA-2: DA-2 Runoff Area=14,034 sf 87.20% Impervious Runoff Depth>5.98"

Tc=6.0 min CN=90 Runoff=2.18 cfs 6,995 cf

Subcatchment DA-3a: DA-3a Runoff Area=72,161 sf 84.29% Impervious Runoff Depth>5.87"

Tc=6.0 min CN=89 Runoff=11.10 cfs 35,272 cf

Subcatchment DA-3b: DA-3b Runoff Area=10,386 sf 74.79% Impervious Runoff Depth>5.18"

Tc=6.0 min CN=83 Runoff=1.47 cfs 4,483 cf

Pond DET-1: Underground Detention Peak Elev=63.07' Storage=10,511 cf Inflow=11.10 cfs 35,272 cf

Outflow=4.19 cfs 34,292 cf

Link POA-1: Mill Brook Inflow=26.80 cfs 90,177 cf

Primary=26.80 cfs 90,177 cf

Link POA-2: Grove Street Inflow=2.18 cfs 6,995 cf

Primary=2.18 cfs 6,995 cf

Link POA-3: Arlington High School Inflow=4.93 cfs 38,776 cf

Primary=4.93 cfs 38,776 cf

Total Runoff Area = 261,439 sf Runoff Volume = 136,928 cf Average Runoff Depth = 6.28" 9.24% Pervious = 24,169 sf 90.76% Impervious = 237,270 sf

Page 44

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

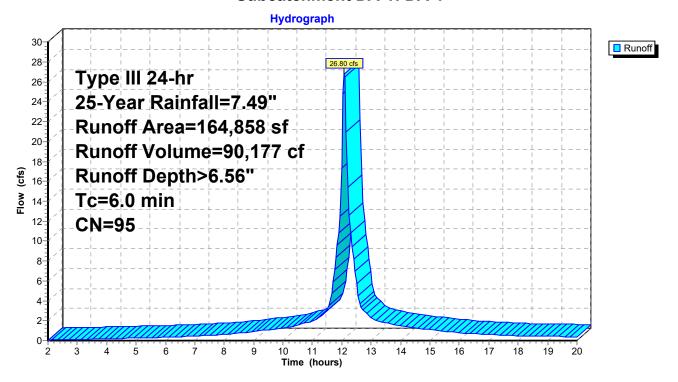
Summary for Subcatchment DA-1: DA-1

Runoff = 26.80 cfs @ 12.09 hrs, Volume= 90,177 cf, Depth> 6.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=7.49"

_	Α	rea (sf)	CN	Description					
Ī		8,417	39	>75% Grass cover, Good, HSG A					
_	1	56,441	98	Paved park	Paved parking, HSG A				
	1	64,858	58 95 Weighted Average						
		8,417 5.11% Pervious Area							
	1	56,441	,	94.89% Imp	pervious Ar	rea			
	Tc	Length	Slope	,	Capacity	·			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	6.0					Direct Entry.			

Subcatchment DA-1: DA-1



Runoff (cfs)

1.18

1.10

1.01

0.93

0.85 0.77

0.72

0.68

0.65

0.61

0.57

0.54

0.50

0.47

0.45

0.44

0.43

0.42

0.41

0.40 0.38

0.37

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 45

Hydrograph for Subcatchment DA-1: DA-1

			11, 111 19			
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00	0.15	0.00	0.04	14.75	6.33	5.73
2.25	0.17	0.01	0.05	15.00	6.40	5.81
2.50	0.19	0.01	0.07	15.25	6.47	5.87
2.75	0.21	0.02	0.09	15.50	6.53	5.94
3.00	0.23	0.02	0.11	15.75	6.58	5.99
3.25	0.25	0.03	0.13	16.00	6.64	6.04
3.50 3.75	0.27 0.30	0.04 0.05	0.14 0.16	16.25 16.50	6.68	6.09 6.14
4.00	0.30	0.05	0.18	16.75	6.73 6.77	6.18
4.25	0.35	0.08	0.20	17.00	6.81	6.22
4.50	0.37	0.09	0.21	17.25	6.85	6.26
4.75	0.40	0.10	0.23	17.50	6.89	6.29
5.00	0.43	0.12	0.25	17.75	6.92	6.33
5.25	0.45	0.14	0.26	18.00	6.95	6.36
5.50	0.48	0.16	0.28	18.25	6.98	6.39
5.75	0.51	0.18	0.30	18.50	7.01	6.41
6.00	0.54	0.20	0.31	18.75	7.04	6.44
6.25	0.57	0.22	0.34	19.00	7.06	6.47
6.50 6.75	0.60 0.64	0.24 0.27	0.38 0.41	19.25 19.50	7.09 7.12	6.50 6.52
7.00	0.68	0.27	0.45	19.75	7.12	6.55
7.25	0.72	0.33	0.49	20.00	7.17	6.57
7.50	0.76	0.36	0.52		• • • • •	0.0.
7.75	0.81	0.40	0.56			
8.00	0.85	0.44	0.60			
8.25	0.91	0.48	0.67			
8.50	0.96	0.53	0.75			
8.75	1.02	0.58	0.83			
9.00	1.09	0.64	0.91			
9.25 9.50	1.16 1.24	0.71 0.78	1.00 1.08			
9.75	1.33	0.75	1.17			
10.00	1.42	0.93	1.25			
10.25	1.51	1.02	1.39			
10.50	1.62	1.13	1.56			
10.75	1.74	1.24	1.74			
11.00	1.87	1.36	1.91			
11.25	2.03	1.51	2.38			
11.50	2.23	1.70	3.03			
11.75 12.00	2.66 3.74	2.12 3.18	7.12 17.38			
12.00	4.83	4.25	12.56			
12.50	5.26	4.68	5.68			
12.75	5.46	4.87	2.97			
13.00	5.62	5.03	2.31			
13.25	5.75	5.16	1.96			
13.50	5.87	5.28	1.79			
13.75	5.98	5.39	1.62			
14.00	6.07	5.49	1.45			
14.25	6.16	5.57 5.66	1.34			
14.50	6.25	5.66	1.26	l		

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 46

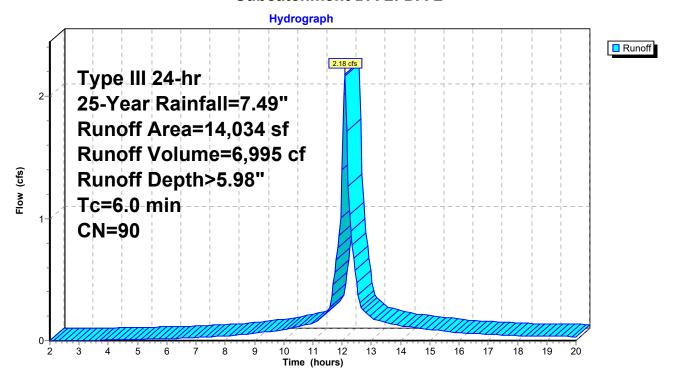
Summary for Subcatchment DA-2: DA-2

Runoff = 2.18 cfs @ 12.09 hrs, Volume= 6,995 cf, Depth> 5.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=7.49"

/	Area (sf)	CN	Description			
	1,796	39	>75% Gras	s cover, Go	ood, HSG A	_
	12,238	98	Paved park	ing, HSG A		
	14,034	90	Weighted A	verage		
	1,796		12.80% Pe	rvious Area		
	12,238		87.20% lm	pervious Ar	ea	
_		0.1		.	B :	
To	9	Slope	,	Capacity	Description	
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
6.0)				Direct Entry.	

Subcatchment DA-2: DA-2



Runoff (cfs)

0.10

0.09 0.08

80.0

0.07

0.06

0.06 0.06

0.05

0.05

0.05

0.05

0.04

0.04

0.04

0.04

0.04 0.03

0.03

0.03 0.03

0.03

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 47

Hydrograph for Subcatchment DA-2: DA-2

			, ,	•		
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)
2.00	0.15	0.00	0.00	14.75	6.33	5.16
2.25	0.17	0.00	0.00	15.00	6.40	5.23
2.50	0.19	0.00	0.00	15.25	6.47	5.30
2.75	0.21	0.00	0.00	15.50	6.53	5.36
3.00	0.23	0.00	0.00	15.75	6.58	5.42
3.25	0.25	0.00	0.00	16.00	6.64	5.47
3.50	0.27	0.00	0.00	16.25	6.68	5.51
3.75	0.30	0.00	0.00	16.50	6.73	5.56
4.00	0.32	0.01	0.00	16.75	6.77	5.60
4.25	0.35	0.01	0.01	17.00	6.81	5.64
4.50	0.37	0.02	0.01	17.25	6.85	5.68
4.75	0.40	0.02	0.01	17.50	6.89	5.71
5.00	0.43	0.03	0.01	17.75	6.92	5.74
5.25	0.45	0.04	0.01	18.00	6.95	5.77
5.50	0.48	0.05	0.01	18.25	6.98	5.80
5.75	0.51	0.06	0.01	18.50	7.01	5.83
6.00	0.54	0.07	0.01	18.75	7.04	5.86
6.25 6.50	0.57 0.60	0.08 0.10	0.02 0.02	19.00 19.25	7.06 7.09	5.89 5.91
6.75	0.64	0.10	0.02	19.23	7.09	5.94
7.00	0.68	0.11	0.02	19.75	7.12	5.96
7.25	0.72	0.15	0.02	20.00	7.17	5.99
7.50	0.76	0.18	0.03	20.00		0.00
7.75	0.81	0.20	0.03			
8.00	0.85	0.23	0.04			
8.25	0.91	0.26	0.04			
8.50	0.96	0.30	0.05			
8.75	1.02	0.34	0.05			
9.00	1.09	0.38	0.06			
9.25	1.16	0.43	0.07			
9.50	1.24	0.49	0.07			
9.75	1.33	0.55	0.08			
10.00	1.42	0.62	0.09			
10.25 10.50	1.51 1.62	0.69 0.78	0.10 0.11			
10.30	1.74	0.78	0.11			
11.00	1.87	0.99	0.13			
11.25	2.03	1.12	0.18			
11.50	2.23	1.29	0.23			
11.75	2.66	1.68	0.56			
12.00	3.74	2.68	1.40			
12.25	4.83	3.71	1.04			
12.50	5.26	4.13	0.47			
12.75	5.46	4.32	0.25			
13.00	5.62	4.47	0.19			
13.25	5.75	4.60	0.16			
13.50	5.87	4.72	0.15			
13.75	5.98	4.82	0.14			
14.00 14.25	6.07 6.16	4.92 5.01	0.12 0.11			
14.23	6.25	5.09	0.11			
14.50	0.23	5.09	0.11			

Page 48

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

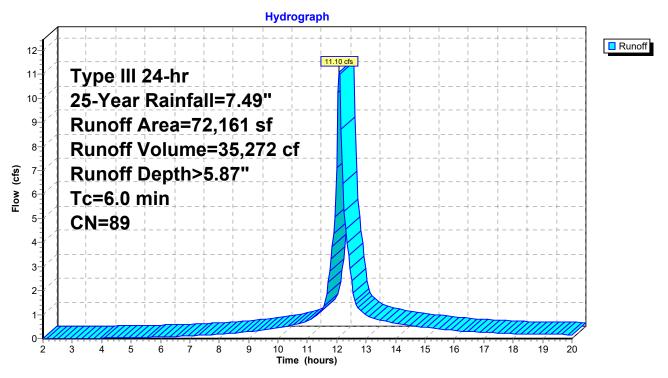
Summary for Subcatchment DA-3a: DA-3a

Runoff = 11.10 cfs @ 12.09 hrs, Volume= 35,272 cf, Depth> 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=7.49"

	rea (sf)	CN	Description		
	11,338	39	>75% Gras	s cover, Go	Good, HSG A
	60,823	98	Paved park	ing, HSG A	A
	72,161	89	Weighted A	verage	
	11,338		15.71% Per	vious Area	a
	60,823		84.29% Imp	pervious Ar	rea
_		01			D
Tc	9	Slope	,	Capacity	·
(min)	(feet)	(ft/ft) (ft/sec)	(cfs)	
6.0					Direct Entry.

Subcatchment DA-3a: DA-3a



Runoff (cfs) 0.50 0.47 0.43 0.40 0.36 0.33 0.31 0.29 0.28 0.26 0.25 0.23 0.22 0.20 0.19 0.19 0.18 0.18 0.17 0.17 0.17 0.16

Arlington-PR - NOAA 14+

6.25

4.98

0.54

14.50

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 49

Hydrograph for Subcatchment DA-3a: DA-3a

			riyarogra	.p., .c. C	aboutoi	mone BA	•
Time	Precip.	Excess	Runoff	Time	Precip.	Excess	
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)	
2.00	0.15	0.00	0.00	14.75	6.33	5.05	
2.25	0.17	0.00	0.00	15.00	6.40	5.12	
2.50	0.19	0.00	0.00	15.25	6.47	5.19	
2.75	0.21	0.00	0.00	15.50	6.53	5.25	
3.00 3.25	0.23 0.25	0.00 0.00	0.00 0.00	15.75 16.00	6.58 6.64	5.30 5.35	
3.50	0.23	0.00	0.00	16.25	6.68	5.40	
3.75	0.27	0.00	0.00	16.50	6.73	5.44	
4.00	0.32	0.00	0.02	16.75	6.77	5.49	
4.25	0.35	0.01	0.02	17.00	6.81	5.52	
4.50	0.37	0.01	0.03	17.25	6.85	5.56	
4.75	0.40	0.02	0.03	17.50	6.89	5.60	
5.00	0.43	0.02	0.04	17.75	6.92	5.63	
5.25	0.45	0.03	0.05	18.00	6.95	5.66	
5.50	0.48	0.04	0.05	18.25	6.98	5.69	
5.75	0.51	0.05	0.06	18.50	7.01	5.72	
6.00 6.25	0.54 0.57	0.06 0.07	0.07 0.08	18.75 19.00	7.04 7.06	5.74 5.77	
6.50	0.60	0.07	0.00	19.00	7.00	5.80	
6.75	0.64	0.00	0.10	19.50	7.12	5.82	
7.00	0.68	0.11	0.11	19.75	7.14	5.85	
7.25	0.72	0.13	0.13	20.00	7.17	5.87	
7.50	0.76	0.15	0.14				
7.75	0.81	0.17	0.16				
8.00	0.85	0.20	0.17				
8.25	0.91	0.23	0.20				
8.50	0.96	0.26	0.23				
8.75 9.00	1.02 1.09	0.30 0.34	0.26 0.29				
9.25	1.16	0.39	0.23				
9.50	1.24	0.44	0.36				
9.75	1.33	0.50	0.40				
10.00	1.42	0.57	0.44				
10.25	1.51	0.64	0.49				
10.50	1.62	0.72	0.57				
10.75	1.74	0.82	0.64				
11.00	1.87 2.03	0.92	0.71				
11.25 11.50	2.03	1.05 1.22	0.90 1.17				
11.75	2.23	1.60	2.81				
12.00	3.74	2.58	7.10				
12.25	4.83	3.61	5.28				
12.50	5.26	4.02	2.41				
12.75	5.46	4.21	1.26				
13.00	5.62	4.37	0.98				
13.25	5.75	4.49	0.84				
13.50	5.87	4.61	0.76				
13.75	5.98	4.71	0.69 0.62				
14.00 14.25	6.07 6.16	4.81 4.80	0.62 0.57				
14.20	0.10	4.89	0.57				

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 50

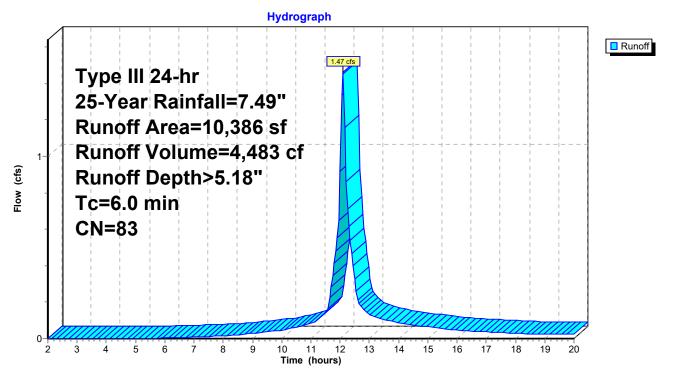
Summary for Subcatchment DA-3b: DA-3b

Runoff = 1.47 cfs @ 12.09 hrs, Volume= 4,483 cf, Depth> 5.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=7.49"

_	Aı	rea (sf)	CN	Description			
		2,618	39	>75% Gras	s cover, Go	Good, HSG A	
_		7,768	98	Paved park	ing, HSG A	A	
		10,386	83	Weighted A	verage		
		2,618		25.21% Pervious Area			
		7,768		74.79% Imp	pervious Ar	rea	
	_		01	.	0 ''	D	
	Tc	Length	Slope	,	Capacity	•	
_	(min)	(feet)	(ft/ft) (ft/sec)	(cfs)		
	6.0					Direct Entry.	

Subcatchment DA-3b: DA-3b



Runoff (cfs) 0.07 0.06 0.06 0.06 0.05 0.05 0.04 0.04 0.04 0.04 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.02 0.02 0.02 0.02 0.02

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 51

Hydrograph for Subcatchment DA-3b: DA-3b

Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00	0.15	0.00	0.00	14.75	6.33	4.39
2.25	0.17	0.00	0.00	15.00	6.40	4.46
2.50	0.19	0.00	0.00	15.25	6.47	4.53
2.75 3.00	0.21 0.23	0.00 0.00	0.00 0.00	15.50 15.75	6.53 6.58	4.58 4.64
3.25	0.25	0.00	0.00	16.00	6.64	4.69
3.50	0.27	0.00	0.00	16.25	6.68	4.73
3.75	0.30	0.00	0.00	16.50	6.73	4.77
4.00	0.32	0.00	0.00	16.75	6.77	4.81
4.25	0.35	0.00	0.00	17.00	6.81	4.85
4.50	0.37	0.00	0.00	17.25	6.85	4.89
4.75	0.40	0.00	0.00	17.50	6.89	4.92
5.00	0.43	0.00	0.00	17.75	6.92	4.95
5.25	0.45	0.00	0.00 0.00	18.00 18.25	6.95 6.98	4.98 5.01
5.50 5.75	0.48 0.51	0.00 0.00	0.00	18.50	7.01	5.04
6.00	0.54	0.00	0.00	18.75	7.01	5.04
6.25	0.57	0.01	0.00	19.00	7.06	5.09
6.50	0.60	0.02	0.01	19.25	7.09	5.11
6.75	0.64	0.02	0.01	19.50	7.12	5.14
7.00	0.68	0.03	0.01	19.75	7.14	5.16
7.25	0.72	0.04	0.01	20.00	7.17	5.19
7.50	0.76	0.05	0.01			
7.75	0.81 0.85	0.06	0.01			
8.00 8.25	0.65	0.08 0.10	0.01 0.02			
8.50	0.96	0.10	0.02			
8.75	1.02	0.14	0.02			
9.00	1.09	0.17	0.03			
9.25	1.16	0.20	0.03			
9.50	1.24	0.24	0.04			
9.75	1.33	0.28	0.04			
10.00	1.42	0.33	0.05			
10.25 10.50	1.51 1.62	0.39 0.45	0.05 0.06			
10.75	1.74	0.43	0.00			
11.00	1.87	0.61	0.08			
11.25	2.03	0.72	0.11			
11.50	2.23	0.86	0.14			
11.75	2.66	1.18	0.35			
12.00	3.74	2.07	0.92			
12.25	4.83	3.02	0.71			
12.50 12.75	5.26 5.46	3.41 3.59	0.33 0.17			
13.00	5.62	3.39	0.17			
13.25	5.75	3.86	0.13			
13.50	5.87	3.97	0.11			
13.75	5.98	4.07	0.10			
14.00	6.07	4.16	0.09			
14.25	6.16	4.24	0.08			
14.50	6.25	4.32	0.07			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 52

Summary for Pond DET-1: Underground Detention System

72,161 sf, 84.29% Impervious, Inflow Depth > 5.87" for 25-Year event Inflow Area =

11.10 cfs @ 12.09 hrs, Volume= Inflow 35,272 cf

Outflow 4.19 cfs @ 12.33 hrs, Volume= 34,292 cf, Atten= 62%, Lag= 14.8 min

Primary 4.19 cfs @ 12.33 hrs, Volume= 34,292 cf

Routing by Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 63.07' @ 12.33 hrs Surf.Area= 4,480 sf Storage= 10,511 cf

Plug-Flow detention time= 52.3 min calculated for 34,292 cf (97% of inflow)

Center-of-Mass det. time= 41.0 min (792.8 - 751.8)

Volume	Invert	Avail.Storage	Storage Description
#1	60.60'	7,672 cf	Oldcastle StormCapture SC1 3'x 24 Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
			Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf 4 Rows adjusted for 32.0 cf perimeter wall
#2	60.60'	5,112 cf	Oldcastle StormCapture SC1 3'x 16 Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
			Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf 4 Rows adjusted for 24.0 cf perimeter wall
		40.704.5	T A

12,784 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	64.18'	Automatic Storage Overflow (Discharged without head)
#1	Primary	60.60'	12.0" Round Culvert
			L= 100.0' CMP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 60.60' / 59.40' S= 0.0120 '/' Cc= 0.900
			n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	60.60'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600
			Limited to weir flow at low heads
#3	Device 1	62.60'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.18 cfs @ 12.33 hrs HW=63.06' (Free Discharge)

-1=Culvert (Inlet Controls 4.18 cfs @ 5.33 fps)

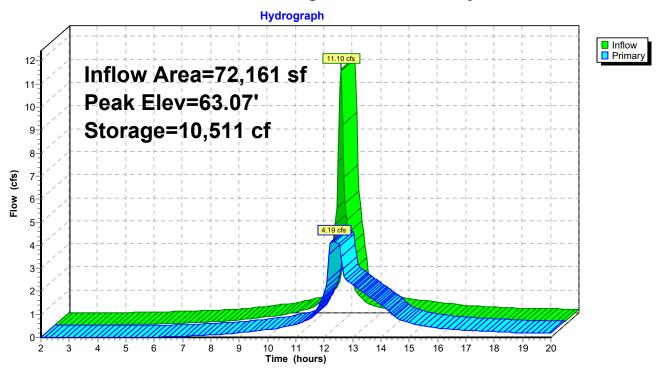
2=Orifice/Grate (Passes < 2.81 cfs potential flow)

-3=Broad-Crested Rectangular Weir (Passes < 3.76 cfs potential flow)

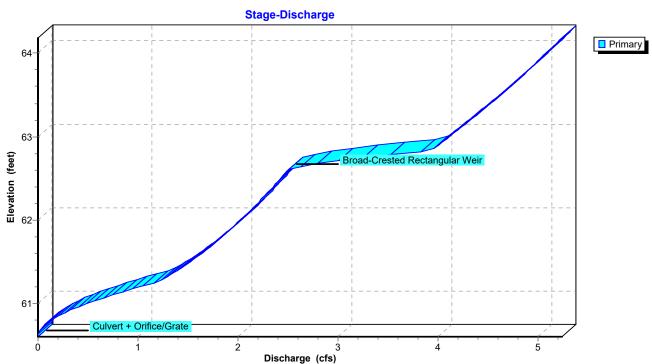
Page 53

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Pond DET-1: Underground Detention System



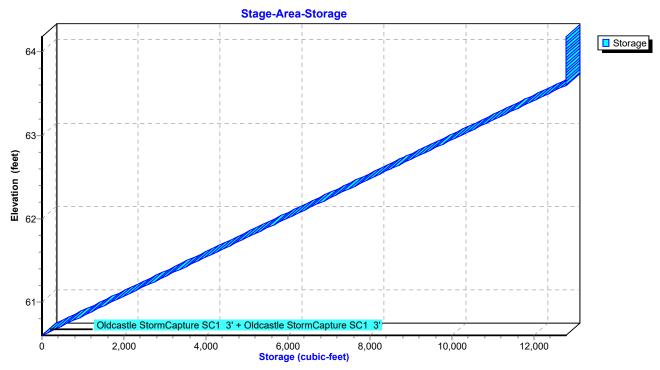
Pond DET-1: Underground Detention System



Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 54

Pond DET-1: Underground Detention System



Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 55

Hydrograph for Pond DET-1: Underground Detention System

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
2.00	0.00	0	60.60	0.00
2.50	0.00	0	60.60	0.00
3.00	0.00	0	60.60	0.00
3.50	0.00	2	60.60	0.00
4.00	0.00	20	60.60	0.00
4.50	0.02	57	60.61	0.00
5.00	0.03	114	60.63	0.00
5.50	0.05	189	60.64	0.00
6.00	0.03	276	60.66	0.01
6.50	0.09	376	60.69	0.03
7.00	0.03	490	60.72	0.05
7.50	0.14	614	60.74	0.07
8.00	0.17	740	60.77	0.10
8.50	0.23	877	60.81	0.14
9.00	0.29	1,038	60.84	0.20
9.50	0.36	1,211	60.88	0.26
10.00	0.44	1,386	60.93	0.34
10.50	0.57	1,586	60.97	0.44
11.00	0.71	1,834	61.03	0.57
11.50	1.17	2,260	61.13	0.83
12.00	7.10	5,442	61.88	1.92
12.50	2.41	9,998	62.95	4.06
13.00	0.98	7,345	62.32	2.30
13.50	0.76	5,138	61.81	1.85
14.00	0.62	3,451	61.41	1.41
14.50	0.54	2,375	61.16	0.90
15.00	0.47	1,939	61.05	0.63
15.50	0.40	1,711	61.00	0.50
16.00	0.33	1,544	60.96	0.42
16.50	0.29	1,412	60.93	0.35
17.00	0.26	1,317	60.91	0.31
17.50	0.23	1,236	60.89	0.27
18.00	0.20	1,160	60.87	0.24
18.50	0.19	1,094	60.86	0.22
19.00	0.18	1,049	60.85	0.20
19.50	0.17	1,013	60.84	0.19
20.00	0.16	981	60.83	0.18

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 56

Summary for Link POA-1: Mill Brook

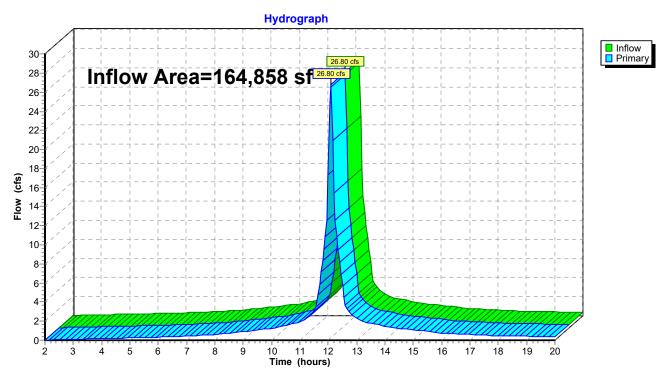
Inflow Area = 164,858 sf, 94.89% Impervious, Inflow Depth > 6.56" for 25-Year event

Inflow = 26.80 cfs @ 12.09 hrs, Volume= 90,177 cf

Primary = 26.80 cfs @ 12.09 hrs, Volume= 90,177 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-1: Mill Brook



Primary

(cfs)

1.18

1.10

1.01

0.93

0.85 0.77

0.72

0.68

0.65

0.61

0.57

0.54

0.50

0.47

0.45 0.44

0.43

0.42

0.41

0.40

0.38

0.37

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 57

Hydrograph for Link POA-1: Mill Brook

			,,			
Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.04	0.00	0.04	14.75	1.18	0.00
2.25	0.05	0.00	0.05	15.00	1.10	0.00
2.50	0.07	0.00	0.07	15.25	1.01	0.00
2.75	0.09	0.00	0.09	15.50	0.93	0.00
3.00	0.11	0.00	0.11	15.75	0.85	0.00
3.25	0.13	0.00	0.13	16.00	0.77	0.00
3.50	0.14	0.00	0.14	16.25	0.72	0.00
3.75	0.16	0.00	0.16	16.50	0.68	0.00
4.00	0.18	0.00	0.18	16.75	0.65	0.00
4.25	0.20	0.00	0.20	17.00	0.61	0.00
4.50	0.21	0.00	0.21	17.25	0.57	0.00
4.75	0.23	0.00	0.23	17.50	0.54	0.00
5.00	0.25	0.00 0.00	0.25	17.75 18.00	0.50 0.47	0.00 0.00
5.25 5.50	0.26 0.28	0.00	0.26 0.28	18.25	0.47	0.00
5.75	0.20	0.00	0.20	18.50	0.43	0.00
6.00	0.31	0.00	0.31	18.75	0.43	0.00
6.25	0.34	0.00	0.34	19.00	0.42	0.00
6.50	0.38	0.00	0.38	19.25	0.41	0.00
6.75	0.41	0.00	0.41	19.50	0.40	0.00
7.00	0.45	0.00	0.45	19.75	0.38	0.00
7.25	0.49	0.00	0.49	20.00	0.37	0.00
7.50	0.52	0.00	0.52			
7.75	0.56	0.00	0.56			
8.00	0.60	0.00	0.60			
8.25	0.67	0.00	0.67			
8.50	0.75	0.00	0.75			
8.75	0.83	0.00	0.83			
9.00	0.91	0.00	0.91			
9.25	1.00	0.00	1.00			
9.50	1.08	0.00	1.08			
9.75	1.17	0.00	1.17			
10.00	1.25	0.00	1.25			
10.25	1.39	0.00	1.39			
10.50 10.75	1.56 1.74	0.00 0.00	1.56 1.74			
11.00	1.74	0.00	1.74			
11.25	2.38	0.00	2.38			
11.50	3.03	0.00	3.03			
11.75	7.12	0.00	7.12			
12.00	17.38	0.00	17.38			
12.25	12.56	0.00	12.56			
12.50	5.68	0.00	5.68			
12.75	2.97	0.00	2.97			
13.00	2.31	0.00	2.31			
13.25	1.96	0.00	1.96			
13.50	1.79	0.00	1.79			
13.75	1.62	0.00	1.62			
14.00	1.45	0.00	1.45			
14.25	1.34	0.00	1.34			
14.50	1.26	0.00	1.26			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 58

Summary for Link POA-2: Grove Street

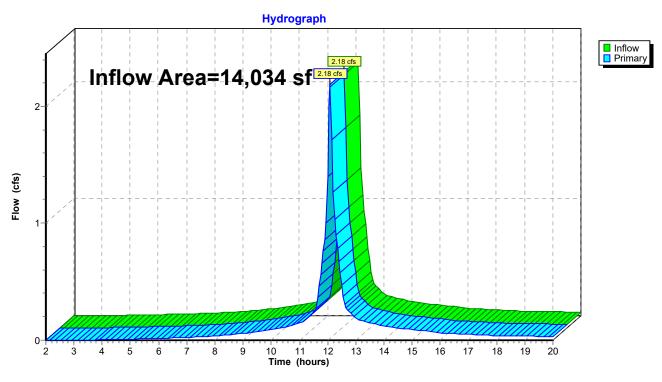
Inflow Area = 14,034 sf, 87.20% Impervious, Inflow Depth > 5.98" for 25-Year event

Inflow = 2.18 cfs @ 12.09 hrs, Volume= 6,995 cf

Primary = 2.18 cfs @ 12.09 hrs, Volume= 6,995 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-2: Grove Street



Primary (cfs) 0.10 0.09 0.08 0.08 0.07 0.06 0.06 0.06 0.05 0.05 0.05 0.05 0.04 0.04 0.04 0.04 0.04 0.03 0.03 0.03 0.03 0.03 Page 59

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Hydrograph for Link POA-2: Grove Street

			, 3			
Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.00	0.00	0.00	14.75	0.10	0.00
2.25	0.00	0.00	0.00	15.00	0.09	0.00
2.50	0.00	0.00	0.00	15.25	0.08	0.00
2.75	0.00	0.00	0.00	15.50	0.08	0.00
3.00	0.00	0.00	0.00	15.75	0.07	0.00
3.25	0.00	0.00	0.00	16.00	0.06	0.00
3.50	0.00	0.00	0.00	16.25	0.06	0.00
3.75	0.00	0.00	0.00	16.50	0.06	0.00
4.00	0.00	0.00	0.00	16.75	0.05	0.00
4.25	0.01	0.00	0.01	17.00	0.05	0.00
4.50	0.01	0.00	0.01	17.25	0.05	0.00
4.75	0.01	0.00	0.01	17.50	0.05	0.00
5.00	0.01	0.00	0.01	17.75	0.04	0.00
5.25	0.01	0.00	0.01	18.00	0.04	0.00
5.50	0.01	0.00	0.01	18.25	0.04	0.00
5.75	0.01	0.00	0.01	18.50	0.04	0.00
6.00	0.01	0.00	0.01	18.75	0.04	0.00
6.25	0.02	0.00	0.02	19.00	0.03	0.00
6.50	0.02	0.00	0.02	19.25	0.03	0.00
6.75	0.02	0.00	0.02	19.50	0.03	0.00
7.00	0.02	0.00	0.02	19.75	0.03	0.00
7.25	0.03	0.00	0.03	20.00	0.03	0.00
7.50	0.03	0.00	0.03			
7.75	0.03	0.00	0.03			
8.00	0.04	0.00	0.04			
8.25	0.04	0.00	0.04			
8.50	0.05	0.00	0.05			
8.75	0.05	0.00	0.05			
9.00	0.06	0.00	0.06			
9.25	0.07	0.00	0.07			
9.50	0.07	0.00	0.07			
9.75	0.08	0.00	0.08			
10.00	0.09	0.00	0.09			
10.25	0.10	0.00	0.10			
10.50	0.11	0.00	0.11			
10.75	0.13	0.00	0.13			
11.00	0.14	0.00	0.14			
11.25	0.18	0.00	0.18			
11.50 11.75	0.23 0.56	0.00 0.00	0.23 0.56			
12.00	1.40	0.00	1.40			
12.00	1.40	0.00	1.40			
12.23	0.47	0.00	0.47			
12.75	0.47	0.00	0.47			
13.00	0.23	0.00	0.23			
13.00	0.19	0.00	0.19			
13.50	0.10	0.00	0.15			
13.75	0.13	0.00	0.13			
14.00	0.14	0.00	0.14			
14.25	0.12	0.00	0.12			
14.50	0.11	0.00	0.11			
	5.11	0.00	0.11			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 60

Summary for Link POA-3: Arlington High School

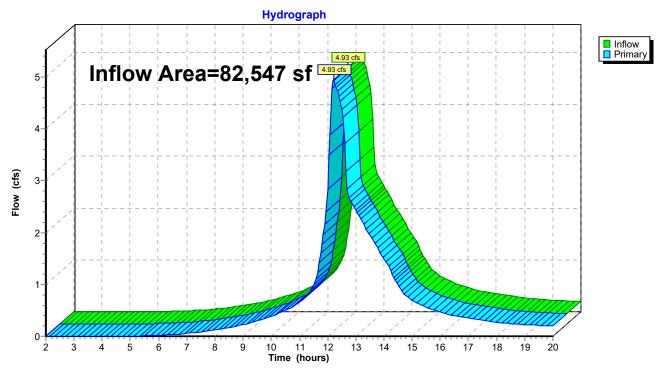
Inflow Area = 82,547 sf, 83.09% Impervious, Inflow Depth > 5.64" for 25-Year event

Inflow = 4.93 cfs @ 12.21 hrs, Volume= 38,776 cf

Primary = 4.93 cfs @ 12.21 hrs, Volume= 38,776 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-3: Arlington High School



Primary (cfs) 0.81 0.70 0.62 0.56 0.51 0.46 0.42 0.39 0.37 0.35 0.33 0.31 0.29 0.27 0.26 0.24 0.23 0.23 0.22 0.21 0.21 0.20

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 61

Hydrograph for Link POA-3: Arlington High School

Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.00	0.00	0.00	14.75	0.81	0.00
2.25	0.00	0.00	0.00	15.00	0.70	0.00
2.50	0.00	0.00	0.00	15.25	0.62	0.00
2.75	0.00	0.00	0.00	15.50	0.56	0.00
3.00	0.00	0.00	0.00	15.75	0.51	0.00
3.25	0.00	0.00	0.00	16.00	0.46	0.00
3.50	0.00	0.00	0.00	16.25	0.42	0.00
3.75	0.00	0.00	0.00	16.50	0.39	0.00
4.00	0.00	0.00	0.00	16.75	0.37	0.00
4.25	0.00	0.00	0.00	17.00 17.25	0.35	0.00
4.50	0.00	0.00	0.00		0.33	0.00
4.75 5.00	0.00	0.00	0.00	17.50	0.31	0.00
5.00	0.00	0.00	0.00	17.75	0.29	0.00
5.25	0.01	0.00	0.01	18.00	0.27	0.00
5.50 5.75	0.01	0.00	0.01	18.25	0.26	0.00
5.75 6.00	0.01 0.02	0.00 0.00	0.01 0.02	18.50 18.75	0.24 0.23	0.00 0.00
6.25	0.02	0.00	0.02	19.00	0.23	0.00
6.50	0.02	0.00	0.02	19.00	0.23	0.00
6.75	0.03	0.00	0.03	19.23	0.22	0.00
7.00	0.04	0.00	0.04	19.75	0.21	0.00
7.00	0.03	0.00	0.03	20.00	0.21	0.00
7.50	0.07	0.00	0.07	20.00	0.20	0.00
7.75	0.00	0.00	0.00			
8.00	0.10	0.00	0.10			
8.25	0.12	0.00	0.12			
8.50	0.14	0.00	0.14			
8.75	0.19	0.00	0.19			
9.00	0.22	0.00	0.13			
9.25	0.26	0.00	0.26			
9.50	0.30	0.00	0.30			
9.75	0.34	0.00	0.34			
10.00	0.39	0.00	0.39			
10.25	0.44	0.00	0.44			
10.50	0.50	0.00	0.50			
10.75	0.57	0.00	0.57			
11.00	0.65	0.00	0.65			
11.25	0.77	0.00	0.77			
11.50	0.97	0.00	0.97			
11.75	1.61	0.00	1.61			
12.00	2.84	0.00	2.84			
12.25	4.86	0.00	4.86			
12.50	4.38	0.00	4.38			
12.75	2.67	0.00	2.67			
13.00	2.43	0.00	2.43			
13.25	2.19	0.00	2.19			
13.50	1.95	0.00	1.95			
13.75	1.72	0.00	1.72			
14.00	1.50	0.00	1.50			
14.25	1.27	0.00	1.27			
14.50	0.98	0.00	0.98			

Proposed Conditions - NOAA ++ Rainfall Type III 24-hr 50-Year Rainfall=8.70"

Prepared by Weston & Sampson

Printed 11/25/2020

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 62

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: DA-1 Runoff Area=164,858 sf 94.89% Impervious Runoff Depth>7.71"

Tc=6.0 min CN=95 Runoff=31.25 cfs 105,955 cf

SubcatchmentDA-2: DA-2 Runoff Area=14,034 sf 87.20% Impervious Runoff Depth>7.12"

Tc=6.0 min CN=90 Runoff=2.57 cfs 8,326 cf

SubcatchmentDA-3a: DA-3a Runoff Area=72,161 sf 84.29% Impervious Runoff Depth>7.00"

Tc=6.0 min CN=89 Runoff=13.10 cfs 42,089 cf

Subcatchment DA-3b: DA-3b Runoff Area=10,386 sf 74.79% Impervious Runoff Depth>6.28"

Tc=6.0 min CN=83 Runoff=1.76 cfs 5,437 cf

Pond DET-1: Underground Detention Peak Elev=63.52' Storage=12,457 cf Inflow=13.10 cfs 42,089 cf

Outflow=4.65 cfs 41,029 cf

Link POA-1: Mill Brook Inflow=31.25 cfs 105,955 cf

Primary=31.25 cfs 105,955 cf

Link POA-2: Grove Street Inflow=2.57 cfs 8,326 cf

Primary=2.57 cfs 8,326 cf

Link POA-3: Arlington High School Inflow=5.70 cfs 46,466 cf

Primary=5.70 cfs 46,466 cf

Total Runoff Area = 261,439 sf Runoff Volume = 161,806 cf Average Runoff Depth = 7.43" 9.24% Pervious = 24,169 sf 90.76% Impervious = 237,270 sf

Page 63

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

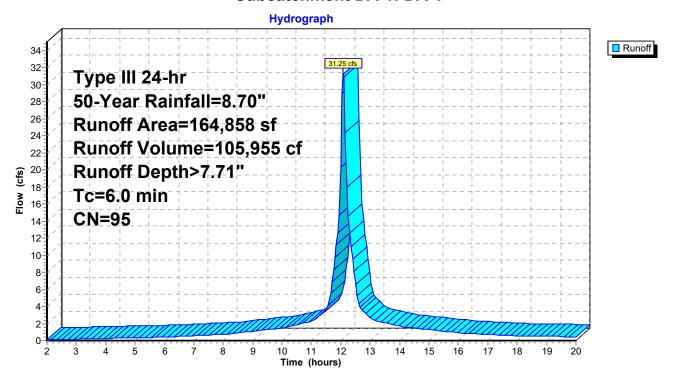
Summary for Subcatchment DA-1: DA-1

Runoff = 31.25 cfs @ 12.09 hrs, Volume= 105,955 cf, Depth> 7.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 50-Year Rainfall=8.70"

	Area (sf)	CN Description							
8,417		39	>75% Gras	Good, HSG A					
156,441		98	Paved parking, HSG A						
164,858		95	5 Weighted Average						
8,417			5.11% Pervious Area						
156,441			94.89% Imp	pervious Ar	rea				
Тс	9	Slope	,	Capacity	•				
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
6.0					Direct Entry.				

Subcatchment DA-1: DA-1



Arlington-PR - NOAA 14+

Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 64

Hydrograph for Subcatchment DA-1: DA-1

Time (hours) Precip. (inches) Excess (inches) Runoff (cfs) Time (hours) (inches) (inches) (inches) Runoff (cfs) 2.00 0.17 0.01 0.07 14.75 7.35 6.75 1.37 2.25 0.20 0.01 0.09 15.00 7.43 6.84 1.27 2.50 0.22 0.02 0.11 15.25 7.51 6.91 1.18 2.75 0.24 0.03 0.13 15.50 7.58 6.99 1.08 3.00 0.27 0.04 0.15 15.75 7.65 7.05 0.99 3.25 0.29 0.05 0.17 16.00 7.71 7.11 0.89 3.75 0.35 0.08 0.21 16.50 7.82 7.22 0.79 4.00 0.37 0.09 0.23 16.75 7.87 7.27 0.75 4.25 0.40 0.11 0.26 17.00 7.91 7.31 0.71 4.75 0.46				, ,	•			
2.00 0.17 0.01 0.07 14.75 7.35 6.75 1.37 2.25 0.20 0.01 0.09 15.00 7.43 6.84 1.27 2.50 0.22 0.02 0.11 15.25 7.51 6.91 1.18 2.75 0.24 0.03 0.13 15.50 7.58 6.99 1.08 3.00 0.27 0.04 0.15 15.75 7.65 7.05 0.99 3.25 0.29 0.05 0.17 16.00 7.71 7.11 0.83 3.50 0.32 0.06 0.19 16.25 7.76 7.17 0.83 3.75 0.35 0.08 0.21 16.50 7.82 7.22 0.79 4.00 0.37 0.09 0.23 16.75 7.87 7.27 0.75 4.25 0.40 0.11 0.26 17.00 7.91 7.31 0.71 4.50 0.43 0.13 0.28 17.25 7.96 7.36 0.67 4.75 0.46								
2.25 0.20 0.01 0.09 15.00 7.43 6.84 1.27 2.50 0.22 0.02 0.11 15.25 7.51 6.91 1.18 2.75 0.24 0.03 0.13 15.50 7.58 6.99 1.08 3.00 0.27 0.04 0.15 15.75 7.65 7.05 0.99 3.25 0.29 0.05 0.17 16.00 7.71 7.11 0.89 3.50 0.32 0.06 0.19 16.25 7.76 7.17 0.83 3.75 0.35 0.08 0.21 16.50 7.82 7.22 0.79 4.00 0.37 0.09 0.23 16.75 7.87 7.27 0.75 4.25 0.40 0.11 0.26 17.00 7.91 7.31 0.71 4.50 0.43 0.13 0.28 17.25 7.96 7.36 0.67 4.75 0.46 0.14 0.30 17.50 8.00 7.40 0.63 5.00 0.50								
2.50 0.22 0.02 0.11 15.25 7.51 6.91 1.18 2.75 0.24 0.03 0.13 15.50 7.58 6.99 1.08 3.00 0.27 0.04 0.15 15.75 7.65 7.05 0.99 3.25 0.29 0.05 0.17 16.00 7.71 7.11 0.83 3.50 0.32 0.06 0.19 16.25 7.76 7.17 0.83 3.75 0.35 0.08 0.21 16.50 7.82 7.22 0.79 4.00 0.37 0.09 0.23 16.75 7.87 7.27 0.75 4.25 0.40 0.11 0.26 17.00 7.91 7.31 0.71 4.50 0.43 0.13 0.28 17.25 7.96 7.36 0.67 4.75 0.46 0.14 0.30 17.50 8.00 7.40 0.63 5.00 0.49 0.16 0.31 17.75 8.04 7.47 0.54 5.50 0.56								
2.75 0.24 0.03 0.13 15.50 7.58 6.99 1.08 3.00 0.27 0.04 0.15 15.75 7.65 7.05 0.99 3.25 0.29 0.06 0.19 16.25 7.76 7.17 0.83 3.75 0.35 0.08 0.21 16.50 7.82 7.22 0.79 4.00 0.37 0.09 0.23 16.75 7.87 7.27 0.75 4.25 0.40 0.11 0.26 17.00 7.91 7.31 0.71 4.50 0.43 0.13 0.28 17.25 7.96 7.36 0.67 4.75 0.46 0.14 0.30 17.50 8.00 7.40 0.63 5.00 0.49 0.16 0.31 17.75 8.04 7.44 0.59 5.25 0.53 0.19 0.33 18.00 8.07 7.47 0.54 5.50 0.56 0.21 0.35 18.25 8.11 7.51 0.52 5.75 0.59								
3.00 0.27 0.04 0.15 15.75 7.65 7.05 0.99 3.25 0.29 0.05 0.17 16.00 7.71 7.11 0.89 3.50 0.32 0.06 0.19 16.25 7.76 7.17 0.83 3.75 0.35 0.08 0.21 16.50 7.82 7.22 0.79 4.00 0.37 0.09 0.23 16.75 7.87 7.27 0.75 4.25 0.40 0.11 0.26 17.00 7.91 7.31 0.71 4.50 0.43 0.13 0.28 17.25 7.96 7.36 0.67 4.75 0.46 0.14 0.30 17.50 8.00 7.40 0.63 5.00 0.49 0.16 0.31 17.75 8.04 7.44 0.59 5.25 0.53 0.19 0.33 18.00 8.07 7.47 0.54 5.50 0.56 0.21 0.35 18.25 8.11 7.51 0.52 5.75 0.59 0.23 0.37 18.50 8.14 7.54 0.51 6.00 0.63 0.26 0.39 18.75 8.17								
3.25 0.29 0.05 0.17 16.00 7.71 7.11 0.89 3.50 0.32 0.06 0.19 16.25 7.76 7.17 0.83 3.75 0.35 0.08 0.21 16.50 7.82 7.22 0.79 4.00 0.37 0.09 0.23 16.75 7.87 7.27 0.75 4.25 0.40 0.11 0.26 17.00 7.91 7.31 0.71 4.50 0.43 0.13 0.28 17.25 7.96 7.36 0.67 4.75 0.46 0.14 0.30 17.50 8.00 7.40 0.63 5.00 0.49 0.16 0.31 17.75 8.04 7.44 0.59 5.25 0.53 0.19 0.33 18.00 8.07 7.47 0.54 5.50 0.56 0.21 0.35 18.25 8.11 7.51 0.52 5.75 0.59 0.23 0.37 18.50 8.14 7.54 0.51 6.00 0.63 0.26 0.39 18.75 8.17 7.57 0.50 6.25 0.66 0.29 0.42 19.00 8.21								
3.50 0.32 0.06 0.19 16.25 7.76 7.17 0.83 3.75 0.35 0.08 0.21 16.50 7.82 7.22 0.79 4.00 0.37 0.09 0.23 16.75 7.87 7.27 0.75 4.25 0.40 0.11 0.26 17.00 7.91 7.31 0.71 4.50 0.43 0.13 0.28 17.25 7.96 7.36 0.67 4.75 0.46 0.14 0.30 17.50 8.00 7.40 0.63 5.00 0.49 0.16 0.31 17.75 8.04 7.44 0.59 5.25 0.53 0.19 0.33 18.00 8.07 7.47 0.54 5.50 0.56 0.21 0.35 18.25 8.11 7.51 0.52 5.75 0.59 0.23 0.37 18.50 8.14 7.54 0.51 6.00 0.63 0.26 0.39 18.75 8.17 7.57 0.50 6.25 0.66 0.29 0.42 19.00 8.21 7.61 0.48 6.50 0.70 0.32 0.46 19.25 8.24								
3.75 0.35 0.08 0.21 16.50 7.82 7.22 0.79 4.00 0.37 0.09 0.23 16.75 7.87 7.27 0.75 4.25 0.40 0.11 0.26 17.00 7.91 7.31 0.71 4.50 0.43 0.13 0.28 17.25 7.96 7.36 0.67 4.75 0.46 0.14 0.30 17.50 8.00 7.40 0.63 5.00 0.49 0.16 0.31 17.75 8.04 7.44 0.59 5.25 0.53 0.19 0.33 18.00 8.07 7.47 0.54 5.50 0.56 0.21 0.35 18.25 8.11 7.51 0.52 5.75 0.59 0.23 0.37 18.50 8.14 7.54 0.51 6.00 0.63 0.26 0.39 18.75 8.17 7.57 0.50 6.25 0.66 0.29 0.42 19.00 8.21 7.61 0.48 6.50 0.70 0.32 0.46 19.25 8.24 7.64 0.47 7.25 0.83 0.42 0.59 20.00 8.33								
4.00 0.37 0.09 0.23 16.75 7.87 7.27 0.75 4.25 0.40 0.11 0.26 17.00 7.91 7.31 0.71 4.50 0.43 0.13 0.28 17.25 7.96 7.36 0.67 4.75 0.46 0.14 0.30 17.50 8.00 7.40 0.63 5.00 0.49 0.16 0.31 17.75 8.04 7.44 0.59 5.25 0.53 0.19 0.33 18.00 8.07 7.47 0.54 5.50 0.56 0.21 0.35 18.25 8.11 7.51 0.52 5.75 0.59 0.23 0.37 18.50 8.14 7.54 0.51 6.00 0.63 0.26 0.39 18.75 8.17 7.57 0.50 6.25 0.66 0.29 0.42 19.00 8.21 7.61 0.48 6.50 0.70 0.32 0.46 19.25 8.24 7.64 0.47 7.25 0.83								
4.25 0.40 0.11 0.26 17.00 7.91 7.31 0.71 4.50 0.43 0.13 0.28 17.25 7.96 7.36 0.67 4.75 0.46 0.14 0.30 17.50 8.00 7.40 0.63 5.00 0.49 0.16 0.31 17.75 8.04 7.44 0.59 5.25 0.53 0.19 0.33 18.00 8.07 7.47 0.54 5.50 0.56 0.21 0.35 18.25 8.11 7.51 0.52 5.75 0.59 0.23 0.37 18.50 8.14 7.54 0.51 6.00 0.63 0.26 0.39 18.75 8.17 7.57 0.50 6.25 0.66 0.29 0.42 19.00 8.21 7.61 0.48 6.50 0.70 0.32 0.46 19.25 8.24 7.64 0.47 7.05 0.79 0.39 0.55 19.75 8.30 7.70 0.45 7.25 0.83								
4.75 0.46 0.14 0.30 17.50 8.00 7.40 0.63 5.00 0.49 0.16 0.31 17.75 8.04 7.44 0.59 5.25 0.53 0.19 0.33 18.00 8.07 7.47 0.54 5.50 0.56 0.21 0.35 18.25 8.11 7.51 0.52 5.75 0.59 0.23 0.37 18.50 8.14 7.54 0.51 6.00 0.63 0.26 0.39 18.75 8.17 7.57 0.50 6.25 0.66 0.29 0.42 19.00 8.21 7.61 0.48 6.50 0.70 0.32 0.46 19.25 8.24 7.64 0.47 6.75 0.74 0.35 0.51 19.50 8.27 7.67 0.46 7.00 0.79 0.39 0.55 19.75 8.30 7.73 0.43 7.50 0.88 0.46 0.64 0.64 0.64 0.61 0.80 8.33 7.73 0.43 <								
5.00 0.49 0.16 0.31 17.75 8.04 7.44 0.59 5.25 0.53 0.19 0.33 18.00 8.07 7.47 0.54 5.50 0.56 0.21 0.35 18.25 8.11 7.51 0.52 5.75 0.59 0.23 0.37 18.50 8.14 7.54 0.51 6.00 0.63 0.26 0.39 18.75 8.17 7.57 0.50 6.25 0.66 0.29 0.42 19.00 8.21 7.61 0.48 6.50 0.70 0.32 0.46 19.25 8.24 7.64 0.47 6.75 0.74 0.35 0.51 19.50 8.27 7.67 0.46 7.00 0.79 0.39 0.55 19.75 8.30 7.70 0.45 7.25 0.83 0.42 0.59 20.00 8.33 7.73 0.43 7.50 0.88 0.46 0.64 0.64 0.64 0.61 0.80 0.83 0.83 0.83	4.50	0.43	0.13	0.28	17.25	7.96	7.36	0.67
5.25 0.53 0.19 0.33 18.00 8.07 7.47 0.54 5.50 0.56 0.21 0.35 18.25 8.11 7.51 0.52 5.75 0.59 0.23 0.37 18.50 8.14 7.54 0.51 6.00 0.63 0.26 0.39 18.75 8.17 7.57 0.50 6.25 0.66 0.29 0.42 19.00 8.21 7.61 0.48 6.50 0.70 0.32 0.46 19.25 8.24 7.64 0.47 6.75 0.74 0.35 0.51 19.50 8.27 7.67 0.46 7.00 0.79 0.39 0.55 19.75 8.30 7.70 0.45 7.25 0.83 0.42 0.59 20.00 8.33 7.73 0.43 7.50 0.88 0.46 0.64 7.75 0.94 0.51 0.68 8.00 0.99 0.56 0.73 8.25 1.05 0.61 0.80 8.50 1.12 0.67 0.90 9.25 1.35 0.88 1.19 9.50 1.44 0.96 1.28 <	4.75			0.30	17.50	8.00		0.63
5.50 0.56 0.21 0.35 18.25 8.11 7.51 0.52 5.75 0.59 0.23 0.37 18.50 8.14 7.54 0.51 6.00 0.63 0.26 0.39 18.75 8.17 7.57 0.50 6.25 0.66 0.29 0.42 19.00 8.21 7.61 0.48 6.50 0.70 0.32 0.46 19.25 8.24 7.64 0.47 6.75 0.74 0.35 0.51 19.50 8.27 7.67 0.46 7.00 0.79 0.39 0.55 19.75 8.30 7.70 0.45 7.25 0.83 0.42 0.59 20.00 8.33 7.73 0.43 7.50 0.88 0.46 0.64 0.64 0.73 8.35 1.05 0.61 0.80 8.50 1.12 0.67 0.90 9.25 1.35 0.88 1.19 9.50 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>								
5.75 0.59 0.23 0.37 18.50 8.14 7.54 0.51 6.00 0.63 0.26 0.39 18.75 8.17 7.57 0.50 6.25 0.66 0.29 0.42 19.00 8.21 7.61 0.48 6.50 0.70 0.32 0.46 19.25 8.24 7.64 0.47 6.75 0.74 0.35 0.51 19.50 8.27 7.67 0.46 7.00 0.79 0.39 0.55 19.75 8.30 7.70 0.45 7.25 0.83 0.42 0.59 20.00 8.33 7.73 0.43 7.50 0.88 0.46 0.64 7.75 0.94 0.51 0.68 8.00 0.99 0.56 0.73 0.80 8.33 7.73 0.43 8.55 1.19 0.73 0.99 9.00 1.27 0.80 1.09 9.25 1.35 0.88								
6.00 0.63 0.26 0.39 18.75 8.17 7.57 0.50 6.25 0.66 0.29 0.42 19.00 8.21 7.61 0.48 6.50 0.70 0.32 0.46 19.25 8.24 7.64 0.47 6.75 0.74 0.35 0.51 19.50 8.27 7.67 0.46 7.00 0.79 0.39 0.55 19.75 8.30 7.70 0.45 7.25 0.83 0.42 0.59 20.00 8.33 7.73 0.43 7.50 0.88 0.46 0.64 0.64 0.64 0.73 0.80 0.73 8.25 1.05 0.61 0.80 0.80 8.50 1.12 0.67 0.90 0.99 9.25 1.35 0.88 1.19 9.50 1.44 0.96 1.28 9.75 1.54 1.05 1.38 1.38 1.38 1.38 1.38 1.38 1.38 1.38 1.47 1.47 1.47 1.47 1.47 1.47 1.47 1.47 1.47								
6.25 0.66 0.29 0.42 19.00 8.21 7.61 0.48 6.50 0.70 0.32 0.46 19.25 8.24 7.64 0.47 6.75 0.74 0.35 0.51 19.50 8.27 7.67 0.46 7.00 0.79 0.39 0.55 19.75 8.30 7.70 0.45 7.25 0.83 0.42 0.59 20.00 8.33 7.73 0.43 7.50 0.88 0.46 0.64 0.64 0.73 8.33 7.73 0.43 8.00 0.99 0.56 0.73 0.80 8.33 7.73 0.43 8.50 1.12 0.67 0.90 0.80 8.50 1.19 0.73 0.99 9.00 1.27 0.80 1.09 9.25 1.35 0.88 1.19 9.50 1.44 0.96 1.28 9.75 1.54 1.05 1.38 1.38 1.38 1.38 1.38 1.38 1.38 1.38 1.44 0.47 1.44 0.47 1.44 <								
6.50 0.70 0.32 0.46 19.25 8.24 7.64 0.47 6.75 0.74 0.35 0.51 19.50 8.27 7.67 0.46 7.00 0.79 0.39 0.55 19.75 8.30 7.70 0.45 7.25 0.83 0.42 0.59 20.00 8.33 7.73 0.45 7.50 0.88 0.46 0.64 7.75 0.94 0.51 0.68 8.00 0.99 0.56 0.73 8.25 1.05 0.61 0.80 8.50 1.12 0.67 0.90 8.75 1.19 0.73 0.99 9.00 1.27 0.80 1.09 9.25 1.35 0.88 1.19 9.50 1.44 0.96 1.28 9.75 1.54 1.05 1.38								
6.75 0.74 0.35 0.51 19.50 8.27 7.67 0.46 7.00 0.79 0.39 0.55 19.75 8.30 7.70 0.45 7.25 0.83 0.42 0.59 20.00 8.33 7.73 0.43 7.50 0.88 0.46 0.64 7.75 0.94 0.51 0.68 8.00 0.99 0.56 0.73 8.25 1.05 0.61 0.80 8.50 1.12 0.67 0.90 8.75 1.19 0.73 0.99 9.00 1.27 0.80 1.09 9.25 1.35 0.88 1.19 9.50 1.44 0.96 1.28 9.75 1.54 1.05 1.38								
7.00 0.79 0.39 0.55 19.75 8.30 7.70 0.45 7.25 0.83 0.42 0.59 20.00 8.33 7.73 0.43 7.50 0.88 0.46 0.64 7.75 0.94 0.51 0.68 8.00 0.99 0.56 0.73 8.25 1.05 0.61 0.80 8.50 1.12 0.67 0.90 8.75 1.19 0.73 0.99 9.00 1.27 0.80 1.09 9.25 1.35 0.88 1.19 9.50 1.44 0.96 1.28 9.75 1.54 1.05 1.38								
7.25 0.83 0.42 0.59 7.50 0.88 0.46 0.64 7.75 0.94 0.51 0.68 8.00 0.99 0.56 0.73 8.25 1.05 0.61 0.80 8.50 1.12 0.67 0.90 8.75 1.19 0.73 0.99 9.00 1.27 0.80 1.09 9.25 1.35 0.88 1.19 9.50 1.44 0.96 1.28 9.75 1.54 1.05 1.38								
7.50 0.88 0.46 0.64 7.75 0.94 0.51 0.68 8.00 0.99 0.56 0.73 8.25 1.05 0.61 0.80 8.50 1.12 0.67 0.90 8.75 1.19 0.73 0.99 9.00 1.27 0.80 1.09 9.25 1.35 0.88 1.19 9.50 1.44 0.96 1.28 9.75 1.54 1.05 1.38								
7.75 0.94 0.51 0.68 8.00 0.99 0.56 0.73 8.25 1.05 0.61 0.80 8.50 1.12 0.67 0.90 8.75 1.19 0.73 0.99 9.00 1.27 0.80 1.09 9.25 1.35 0.88 1.19 9.50 1.44 0.96 1.28 9.75 1.54 1.05 1.38					20.00	0.00	1.10	0.40
8.00 0.99 0.56 0.73 8.25 1.05 0.61 0.80 8.50 1.12 0.67 0.90 8.75 1.19 0.73 0.99 9.00 1.27 0.80 1.09 9.25 1.35 0.88 1.19 9.50 1.44 0.96 1.28 9.75 1.54 1.05 1.38								
8.25 1.05 0.61 0.80 8.50 1.12 0.67 0.90 8.75 1.19 0.73 0.99 9.00 1.27 0.80 1.09 9.25 1.35 0.88 1.19 9.50 1.44 0.96 1.28 9.75 1.54 1.05 1.38								
8.50 1.12 0.67 0.90 8.75 1.19 0.73 0.99 9.00 1.27 0.80 1.09 9.25 1.35 0.88 1.19 9.50 1.44 0.96 1.28 9.75 1.54 1.05 1.38								
9.00 1.27 0.80 1.09 9.25 1.35 0.88 1.19 9.50 1.44 0.96 1.28 9.75 1.54 1.05 1.38	8.50		0.67	0.90				
9.25 1.35 0.88 1.19 9.50 1.44 0.96 1.28 9.75 1.54 1.05 1.38								
9.50								
9.75 1.54 1.05 1.38								
40.00 4.04 4.45 4.40 [
10.00 1.64 1.15 1.48								
10.25								
10.75 2.02 1.50 2.05								
11.00 2.17 1.65 2.25								
11.25 2.36 1.83 2.79								
11.50 2.59 2.05 3.55								
11.75 3.09 2.54 8.33								
12.00 4.35 3.78 20.29	12.00	4.35	3.78	20.29				
12.25 5.61 5.02 14.63								
12.50 6.11 5.52 6.61								
12.75 6.34 5.75 3.46								
13.00 6.52 5.93 2.69								
13.25 6.68 6.08 2.29 13.50 6.82 6.22 2.09								
13.50 6.82 6.22 2.09 13.75 6.94 6.35 1.89								
13.75 6.94 6.35 1.69 14.00 7.06 6.46 1.69								
14.25 7.16 6.56 1.56								
14.50 7.26 6.66 1.46								

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

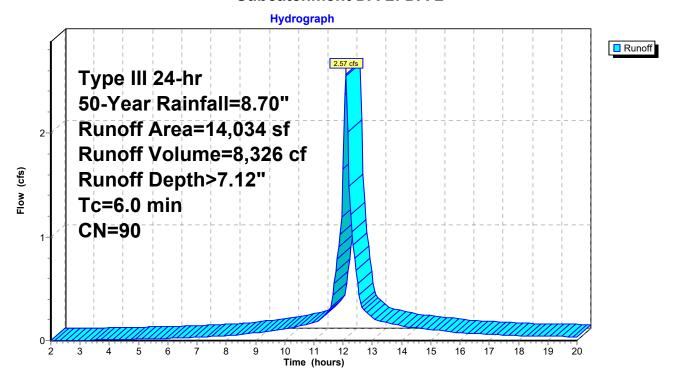
Summary for Subcatchment DA-2: DA-2

Runoff = 2.57 cfs @ 12.09 hrs, Volume= 8,326 cf, Depth> 7.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 50-Year Rainfall=8.70"

	Α	rea (sf)	CN	Description				
		1,796	39	>75% Gras	Good, HSG A			
		12,238	98	8 Paved parking, HSG A				
		14,034	90	Weighted A	verage			
1,796 12.80% Pervious Area					a			
	12,238 87.20% Impervious Area				pervious Ar	rea		
	т.	ما المحمد ا	Clana	Valacity	Consoitu	Description		
	Tc	Length	Slope	,	Capacity	!		
((min)	(feet)	(ft/ft)	(ft/sec)	(cfs)			
	6.0					Direct Entry.		

Subcatchment DA-2: DA-2



Runoff (cfs) 0.11 0.11 0.10 0.09 80.0 80.0 0.07 0.07 0.06 0.06 0.06 0.05 0.05 0.05 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.04

14.50

7.26

6.07

0.12

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 66

Hydrograph for Subcatchment DA-2: DA-2

			, 9			
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00	0.17	0.00	0.00	14.75	7.35	6.16
2.25	0.20	0.00	0.00	15.00	7.43	6.25
2.50	0.22	0.00	0.00	15.25	7.51	6.32
2.75	0.24	0.00	0.00	15.50	7.58	6.39
3.00	0.27	0.00	0.00	15.75	7.65	6.46
3.25	0.29	0.00	0.00	16.00	7.71	6.52
3.50 3.75	0.32 0.35	0.01 0.01	0.00 0.01	16.25 16.50	7.76 7.82	6.57 6.62
4.00	0.33	0.01	0.01	16.75	7.87	6.67
4.25	0.40	0.03	0.01	17.00	7.91	6.72
4.50	0.43	0.03	0.01	17.25	7.96	6.76
4.75	0.46	0.04	0.01	17.50	8.00	6.80
5.00	0.49	0.05	0.01	17.75	8.04	6.84
5.25	0.53	0.07	0.02	18.00	8.07	6.88
5.50	0.56	0.08	0.02	18.25	8.11	6.91
5.75	0.59	0.09	0.02	18.50	8.14	6.94
6.00	0.63	0.11	0.02	18.75	8.17	6.98
6.25	0.66	0.12	0.02	19.00	8.21	7.01
6.50 6.75	0.70 0.74	0.14 0.17	0.03 0.03	19.25 19.50	8.24 8.27	7.04 7.07
7.00	0.74	0.17	0.03	19.30	8.30	7.07
7.25	0.73	0.19	0.03	20.00	8.33	7.10 7.13
7.50	0.88	0.25	0.04	20.00	0.00	7.10
7.75	0.94	0.28	0.04			
8.00	0.99	0.31	0.05			
8.25	1.05	0.35	0.05			
8.50	1.12	0.40	0.06			
8.75	1.19	0.45	0.07			
9.00	1.27	0.51	0.07			
9.25	1.35	0.57	0.08			
9.50 9.75	1.44 1.54	0.64 0.72	0.09 0.10			
10.00	1.64	0.72	0.10			
10.25	1.76	0.89	0.11			
10.50	1.88	1.00	0.14			
10.75	2.02	1.11	0.16			
11.00	2.17	1.24	0.17			
11.25	2.36	1.41	0.22			
11.50	2.59	1.61	0.28			
11.75	3.09	2.07	0.66			
12.00	4.35	3.25	1.65 1.21			
12.25 12.50	5.61 6.11	4.47 4.95	0.55			
12.75	6.34	5.18	0.33			
13.00	6.52	5.36	0.23			
13.25	6.68	5.51	0.19			
13.50	6.82	5.64	0.17			
13.75	6.94	5.77	0.16			
14.00	7.06	5.88	0.14			
14.25	7.16	5.98	0.13			

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

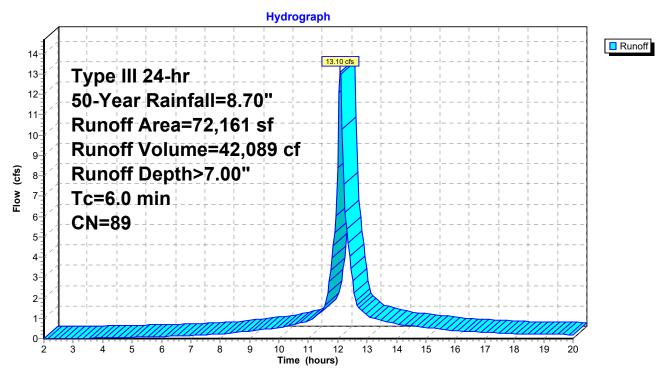
Summary for Subcatchment DA-3a: DA-3a

Runoff = 13.10 cfs @ 12.09 hrs, Volume= 42,089 cf, Depth> 7.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 50-Year Rainfall=8.70"

	Area (sf)	CN	Description				
	11,338	39 >75% Grass cover, Good, HSG A					
	60,823	98	Paved parking, HSG A				
	72,161	89	Weighted A	verage			
	11,338 15.71% Pervious Area						
	60,823 84.29% Impervious Area				rea		
т.		Clana	Valacity	Consoitu	Description		
, To	5	Slope	,	Capacity	!		
(min) (feet)	(ft/ft)	(ft/sec)	(cfs)			
6.0)				Direct Entry.		

Subcatchment DA-3a: DA-3a



Runoff (cfs) 0.59 0.55 0.51 0.47 0.43 0.39 0.36 0.34 0.32 0.31 0.29 0.27 0.25 0.23 0.22 0.22 0.21 0.21 0.20 0.20 0.19 0.19

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 68

Hydrograph for Subcatchment DA-3a: DA-3a

							_
Time	Precip.	Excess	Runoff	Time	Precip.	Excess	
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)	
2.00	0.17	0.00	0.00	14.75	7.35	6.05	_
2.25	0.20	0.00	0.00	15.00	7.43	6.13	
2.50	0.22	0.00	0.00	15.25	7.51	6.21	
2.75	0.24	0.00	0.00	15.50	7.58	6.28	
3.00	0.27	0.00	0.00	15.75	7.65	6.34	
3.25	0.29	0.00	0.01	16.00	7.71	6.40	
3.50	0.32	0.00	0.02	16.25	7.76	6.45	
3.75	0.35	0.01	0.02	16.50	7.82	6.51	
4.00	0.37	0.01	0.03	16.75	7.87	6.55	
4.25	0.40	0.02	0.04	17.00	7.91	6.60	
4.50	0.43	0.02	0.05	17.25	7.96	6.64	
4.75	0.46	0.03	0.05	17.50	8.00	6.69	
5.00	0.49	0.04	0.06	17.75	8.04	6.72	
5.25	0.53	0.05	0.07	18.00	8.07	6.76	
5.50	0.56	0.06	0.08	18.25	8.11	6.79	
5.75	0.59	0.08	0.09	18.50	8.14	6.83	
6.00	0.63	0.09	0.09	18.75	8.17	6.86	
6.25	0.66	0.10	0.11	19.00	8.21	6.89	
6.50	0.70	0.12	0.12	19.25	8.24	6.92	
6.75	0.74	0.14	0.13	19.50	8.27	6.95	
7.00 7.25	0.79	0.16	0.15	19.75	8.30 8.33	6.98	
	0.83 0.88	0.19 0.22	0.17	20.00	0.33	7.01	
7.50 7.75	0.86	0.22	0.19 0.20				
8.00	0.94	0.23	0.20				
8.25	1.05	0.28	0.25				
8.50	1.12	0.36	0.29				
8.75	1.12	0.41	0.33				
9.00	1.13	0.46	0.37				
9.25	1.35	0.52	0.41				
9.50	1.44	0.59	0.45				
9.75	1.54	0.66	0.49				
10.00	1.64	0.74	0.54				
10.25	1.76	0.83	0.61				
10.50	1.88	0.93	0.69				
10.75	2.02	1.05	0.78				
11.00	2.17	1.17	0.87				
11.25	2.36	1.33	1.09				
11.50	2.59	1.54	1.40				
11.75	3.09	1.98	3.36				
12.00	4.35	3.15	8.41				
12.25	5.61	4.36	6.20				
12.50	6.11	4.84	2.82				
12.75	6.34	5.07	1.48				
13.00	6.52	5.25	1.15				
13.25	6.68	5.39	0.98				
13.50	6.82	5.53	0.90				
13.75	6.94	5.65	0.81				
14.00	7.06	5.76 5.86	0.73				
14.25	7.16	5.86 5.06	0.67				
14.50	7.26	5.96	0.63				

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 69

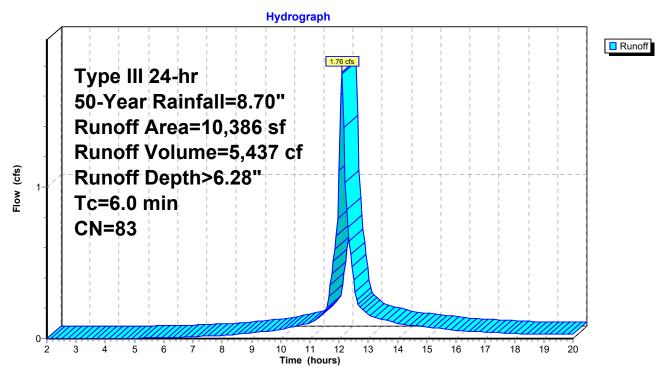
Summary for Subcatchment DA-3b: DA-3b

Runoff = 1.76 cfs @ 12.09 hrs, Volume= 5,437 cf, Depth> 6.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 50-Year Rainfall=8.70"

_	Aı	rea (sf)	CN	Description					
_		2,618	39	>75% Grass cover, Good, HSG A					
_		7,768	98	Paved parking, HSG A					
_		10,386	83	83 Weighted Average					
		2,618		25.21% Pervious Area					
		7,768		74.79% lmp	ervious Ar	vrea			
	_		01			5			
	Tc	Length	Slope	,	Capacity	·			
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	6.0					Direct Entry.			

Subcatchment DA-3b: DA-3b



Runoff (cfs) 0.08 80.0 0.07 0.07 0.06 0.05 0.05 0.05 0.05 0.04 0.04 0.04 0.04 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 70

Hydrograph for Subcatchment DA-3b: DA-3b

			, ,	-		
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00	0.17	0.00	0.00	14.75	7.35	5.36
2.25	0.20	0.00	0.00	15.00	7.43	5.44
2.50	0.22	0.00	0.00	15.25	7.51	5.51
2.75	0.24	0.00	0.00	15.50	7.58	5.58
3.00	0.27	0.00	0.00	15.75	7.65	5.64
3.25	0.29	0.00	0.00	16.00	7.71	5.70
3.50 3.75	0.32 0.35	0.00 0.00	0.00 0.00	16.25 16.50	7.76 7.82	5.75 5.80
4.00	0.33	0.00	0.00	16.75	7.87	5.85
4.25	0.40	0.00	0.00	17.00	7.91	5.89
4.50	0.43	0.00	0.00	17.25	7.96	5.94
4.75	0.46	0.00	0.00	17.50	8.00	5.98
5.00	0.49	0.00	0.00	17.75	8.04	6.01
5.25	0.53	0.01	0.00	18.00	8.07	6.05
5.50	0.56	0.01	0.00	18.25	8.11	6.08
5.75	0.59	0.01	0.00	18.50	8.14	6.11
6.00	0.63	0.02	0.01	18.75	8.17	6.14
6.25	0.66	0.03	0.01	19.00	8.21	6.17
6.50	0.70	0.04	0.01	19.25	8.24	6.20
6.75	0.74	0.05	0.01	19.50	8.27	6.23
7.00	0.79	0.06	0.01	19.75	8.30	6.26
7.25 7.50	0.83	0.07 0.09	0.01 0.02	20.00	8.33	6.29
7.30	0.88 0.94	0.09	0.02			
8.00	0.94	0.11	0.02			
8.25	1.05	0.15	0.02			
8.50	1.12	0.18	0.03			
8.75	1.19	0.22	0.03			
9.00	1.27	0.25	0.04			
9.25	1.35	0.30	0.04			
9.50	1.44	0.35	0.05			
9.75	1.54	0.40	0.05			
10.00	1.64	0.46	0.06			
10.25	1.76	0.53	0.07			
10.50	1.88	0.62	0.08			
10.75 11.00	2.02 2.17	0.71 0.82	0.09 0.10			
11.00	2.17	0.82	0.10			
11.50	2.59	1.13	0.17			
11.75	3.09	1.52	0.43			
12.00	4.35	2.59	1.11			
12.25	5.61	3.73	0.85			
12.50	6.11	4.19	0.39			
12.75	6.34	4.41	0.20			
13.00	6.52	4.58	0.16			
13.25	6.68	4.72	0.14			
13.50	6.82	4.85	0.12			
13.75	6.94	4.97 5.09	0.11			
14.00 14.25	7.06 7.16	5.08 5.18	0.10 0.09			
14.23	7.10	5.10	0.09			
17.50	1.20	0.21	0.03			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 71

Summary for Pond DET-1: Underground Detention System

72,161 sf, 84.29% Impervious, Inflow Depth > 7.00" for 50-Year event Inflow Area =

13.10 cfs @ 12.09 hrs, Volume= Inflow 42.089 cf

Outflow 4.65 cfs @ 12.35 hrs, Volume= 41,029 cf, Atten= 65%, Lag= 16.0 min

Primary 4.65 cfs @ 12.35 hrs, Volume= 41,029 cf

Routing by Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 63.52' @ 12.35 hrs Surf.Area= 4,480 sf Storage= 12,457 cf

Plug-Flow detention time= 50.9 min calculated for 41,029 cf (97% of inflow)

Center-of-Mass det. time= 40.5 min (788.2 - 747.7)

Volume	Invert	Avail.Storage	Storage Description
#1	60.60'	7,672 cf	Oldcastle StormCapture SC1 3'x 24
			Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
			Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf
			4 Rows adjusted for 32.0 cf perimeter wall
#2	60.60'	5,112 cf	Oldcastle StormCapture SC1 3'x 16
			Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
			Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf
			4 Rows adjusted for 24.0 cf perimeter wall
<u> </u>	·	12 794 of	Total Available Storage

12,784 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	64.18'	Automatic Storage Overflow (Discharged without head)
#1	Primary	60.60'	12.0" Round Culvert
			L= 100.0' CMP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 60.60' / 59.40' S= 0.0120 '/' Cc= 0.900
			n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	60.60'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600
			Limited to weir flow at low heads
#3	Device 1	62.60'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.65 cfs @ 12.35 hrs HW=63.52' (Free Discharge)

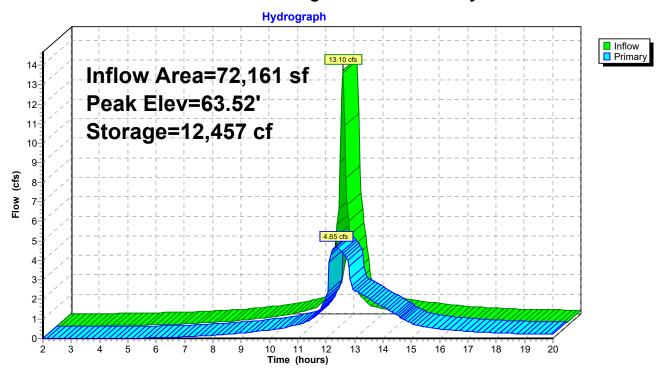
-1=Culvert (Inlet Controls 4.65 cfs @ 5.92 fps)

2=Orifice/Grate (Passes < 3.09 cfs potential flow)

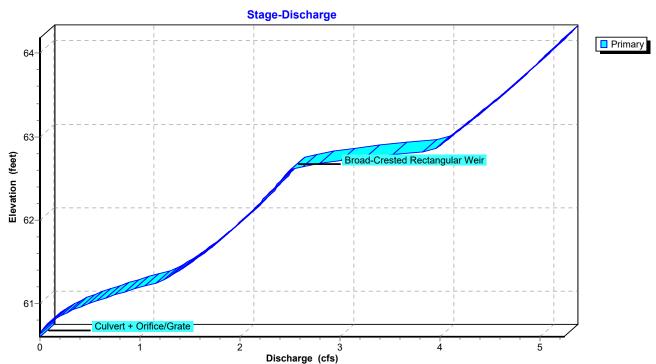
-3=Broad-Crested Rectangular Weir (Passes < 11.73 cfs potential flow)

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Pond DET-1: Underground Detention System



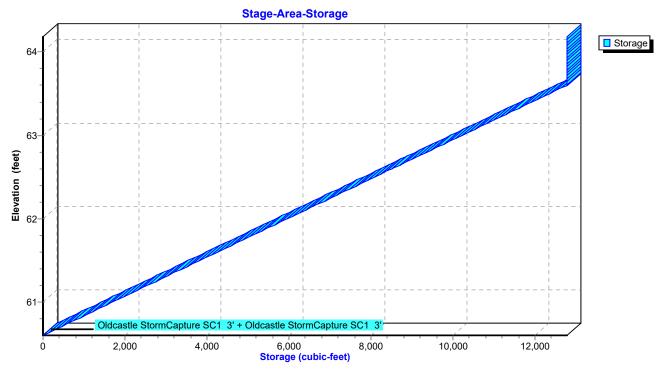
Pond DET-1: Underground Detention System



Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 73

Pond DET-1: Underground Detention System



Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 74

Hydrograph for Pond DET-1: Underground Detention System

(hours) (cfs) (cubic-feet) (feet) (cf 2.00 0.00 0 60.60 0.0 2.50 0.00 0 60.60 0.0 3.00 0.00 1 60.60 0.0 3.50 0.02 18 60.60 0.0 4.00 0.03 58 60.61 0.0 4.50 0.05 122 60.63 0.0
2.50 0.00 0 60.60 0.0 3.00 0.00 1 60.60 0.0 3.50 0.02 18 60.60 0.0 4.00 0.03 58 60.61 0.0 4.50 0.05 122 60.63 0.0
3.00 0.00 1 60.60 0.0 3.50 0.02 18 60.60 0.0 4.00 0.03 58 60.61 0.0 4.50 0.05 122 60.63 0.0
3.50 0.02 18 60.60 0.0 4.00 0.03 58 60.61 0.0 4.50 0.05 122 60.63 0.0
4.00 0.03 58 60.61 0.0 4.50 0.05 122 60.63 0.0
4.50 0.05 122 60.63 0.
5.00 0.06 208 60.65 0.0
5.50 0.08 308 60.67 0.0
6.00 0.09 415 60.70 0.
6.50 0.12 527 60.72 0.4
7.00 0.15 651 60.75 0.0
7.50 0.19 780 60.78 0.
8.00 0.22 909 60.81 0.
8.50 0.29 1,049 60.85 0.3
9.00 0.37 1,219 60.89 0.3
9.50 0.45 1,402 60.93 0.3
10.00 0.54 1,586 60.97 0.4
10.50 0.69 1,800 61.02 0.8
11.00 0.87 2,070 61.09 0.
11.50 1.40 2,548 61.20 1.0
12.00 8.41 6,454 62.11 2.
12.50 2.82 11,991 63.41 4.
13.00 1.15 8,278 62.54 2.4
13.50 0.90 6,011 62.01 2.0 14.00 0.73 4,184 61.58 1.0
14.00 0.73 4,184 61.58 1.0 14.50 0.63 2,846 61.27 1.3
14.50 0.65 2,646 61.27 1 15.00 0.55 2,178 61.11 0.
15.50 0.47 1,876 61.04 0.4
16.00 0.39 1,677 60.99 0.47
16.50 0.34 1,528 60.96 0.4
17.00 0.31 1,424 60.93 0.3
17.50 0.27 1,336 60.91 0.3
18.00 0.23 1,252 60.89 0.3
18.50 0.22 1,181 60.88 0.3
19.00 0.21 1,132 60.87 0.3
19.50 0.20 1,094 60.86 0.3
20.00 0.19 1,061 60.85 0.3

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 75

Summary for Link POA-1: Mill Brook

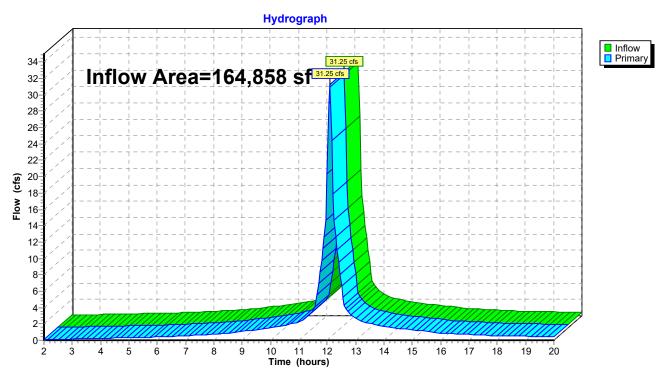
Inflow Area = 164,858 sf, 94.89% Impervious, Inflow Depth > 7.71" for 50-Year event

Inflow = 31.25 cfs @ 12.09 hrs, Volume= 105,955 cf

Primary = 31.25 cfs @ 12.09 hrs, Volume= 105,955 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-1: Mill Brook



Primary (cfs) 1.37 1.27 1.18 1.08 0.99 0.89 0.83 0.79 0.75 0.71 0.67 0.63 0.59 0.54 0.52 0.51 0.50 0.48 0.47 0.46 0.45 0.43

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 76

Hydrograph for Link POA-1: Mill Brook

Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.07	0.00	0.07	14.75	1.37	0.00
2.25	0.09	0.00	0.09	15.00	1.27	0.00
2.50	0.11	0.00	0.11	15.25	1.18	0.00
2.75	0.13	0.00	0.13	15.50	1.08	0.00
3.00	0.15	0.00	0.15	15.75	0.99	0.00
3.25	0.17	0.00	0.17	16.00	0.89	0.00
3.50	0.19	0.00	0.19	16.25	0.83	0.00
3.75	0.21	0.00	0.21	16.50	0.79	0.00
4.00	0.23	0.00	0.23	16.75	0.75	0.00 0.00
4.25 4.50	0.26 0.28	0.00 0.00	0.26 0.28	17.00 17.25	0.71 0.67	0.00
4.30 4.75	0.20	0.00	0.20	17.23	0.67	0.00
5.00	0.30	0.00	0.30	17.30	0.63	0.00
5.25	0.31	0.00	0.33	18.00	0.54	0.00
5.50	0.35	0.00	0.35	18.25	0.52	0.00
5.75	0.37	0.00	0.37	18.50	0.51	0.00
6.00	0.39	0.00	0.39	18.75	0.50	0.00
6.25	0.42	0.00	0.42	19.00	0.48	0.00
6.50	0.46	0.00	0.46	19.25	0.47	0.00
6.75	0.51	0.00	0.51	19.50	0.46	0.00
7.00	0.55	0.00	0.55	19.75	0.45	0.00
7.25	0.59	0.00	0.59	20.00	0.43	0.00
7.50	0.64	0.00	0.64			
7.75	0.68	0.00	0.68			
8.00	0.73	0.00	0.73			
8.25	0.80	0.00	0.80			
8.50	0.90	0.00	0.90			
8.75	0.99	0.00	0.99			
9.00	1.09	0.00	1.09			
9.25	1.19	0.00	1.19			
9.50	1.28	0.00	1.28			
9.75 10.00	1.38 1.48	0.00 0.00	1.38 1.48			
10.00	1.46	0.00	1.46			
10.23	1.85	0.00	1.85			
10.75	2.05	0.00	2.05			
11.00	2.25	0.00	2.25			
11.25	2.79	0.00	2.79			
11.50	3.55	0.00	3.55			
11.75	8.33	0.00	8.33			
12.00	20.29	0.00	20.29			
12.25	14.63	0.00	14.63			
12.50	6.61	0.00	6.61			
12.75	3.46	0.00	3.46			
13.00	2.69	0.00	2.69			
13.25	2.29	0.00	2.29			
13.50	2.09	0.00	2.09			
13.75	1.89	0.00	1.89			
14.00	1.69	0.00	1.69			
14.25	1.56	0.00	1.56			
14.50	1.46	0.00	1.46			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 77

Summary for Link POA-2: Grove Street

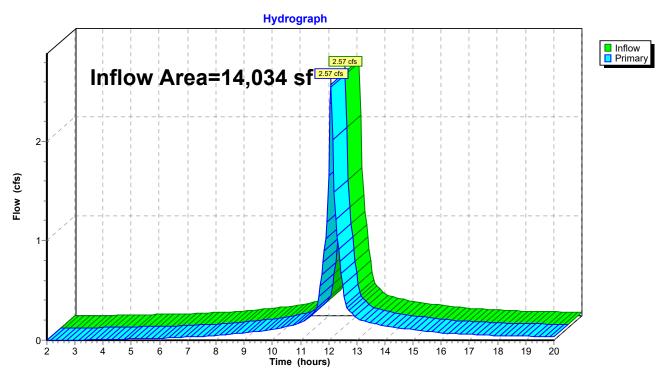
Inflow Area = 14,034 sf, 87.20% Impervious, Inflow Depth > 7.12" for 50-Year event

Inflow = 2.57 cfs @ 12.09 hrs, Volume= 8,326 cf

Primary = 2.57 cfs @ 12.09 hrs, Volume= 8,326 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-2: Grove Street



Primary (cfs) 0.11 0.11 0.10 0.09 0.08 0.08 0.07 0.07 0.06 0.06 0.06 0.05 0.05 0.05 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.04

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 78

Hydrograph for Link POA-2: Grove Street

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)
2.00	0.00	0.00	0.00	14.75	0.11	0.00
2.25	0.00	0.00	0.00	15.00	0.11	0.00
2.50	0.00	0.00	0.00	15.25	0.10	0.00
2.75	0.00	0.00	0.00	15.50	0.09	0.00
3.00	0.00	0.00	0.00	15.75	0.08	0.00
3.25	0.00	0.00	0.00	16.00	0.08	0.00
3.50	0.00	0.00	0.00	16.25	0.07	0.00
3.75	0.01	0.00	0.01	16.50	0.07	0.00
4.00	0.01	0.00	0.01	16.75	0.06	0.00
4.25 4.50	0.01 0.01	0.00 0.00	0.01 0.01	17.00 17.25	0.06 0.06	0.00 0.00
4.75	0.01	0.00	0.01	17.23	0.05	0.00
5.00	0.01	0.00	0.01	17.75	0.05	0.00
5.25	0.02	0.00	0.02	18.00	0.05	0.00
5.50	0.02	0.00	0.02	18.25	0.04	0.00
5.75	0.02	0.00	0.02	18.50	0.04	0.00
6.00	0.02	0.00	0.02	18.75	0.04	0.00
6.25	0.02	0.00	0.02	19.00	0.04	0.00
6.50	0.03	0.00	0.03	19.25	0.04	0.00
6.75	0.03	0.00	0.03	19.50	0.04	0.00
7.00	0.03	0.00	0.03	19.75	0.04	0.00
7.25	0.04	0.00	0.04	20.00	0.04	0.00
7.50	0.04	0.00	0.04			
7.75 8.00	0.04 0.05	0.00 0.00	0.04 0.05			
8.25	0.05	0.00	0.05			
8.50	0.06	0.00	0.06			
8.75	0.07	0.00	0.07			
9.00	0.07	0.00	0.07			
9.25	0.08	0.00	0.08			
9.50	0.09	0.00	0.09			
9.75	0.10	0.00	0.10			
10.00	0.11	0.00	0.11			
10.25	0.12	0.00	0.12			
10.50	0.14	0.00	0.14			
10.75	0.16	0.00	0.16			
11.00 11.25	0.17 0.22	0.00 0.00	0.17 0.22			
11.50	0.22	0.00	0.22			
11.75	0.66	0.00	0.26			
12.00	1.65	0.00	1.65			
12.25	1.21	0.00	1.21			
12.50	0.55	0.00	0.55			
12.75	0.29	0.00	0.29			
13.00	0.23	0.00	0.23			
13.25	0.19	0.00	0.19			
13.50	0.17	0.00	0.17			
13.75	0.16	0.00	0.16			
14.00 14.25	0.14 0.13	0.00 0.00	0.14 0.13			
14.25	0.13	0.00	0.13			
1-7.00	0.12	0.00	0.12			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 79

Summary for Link POA-3: Arlington High School

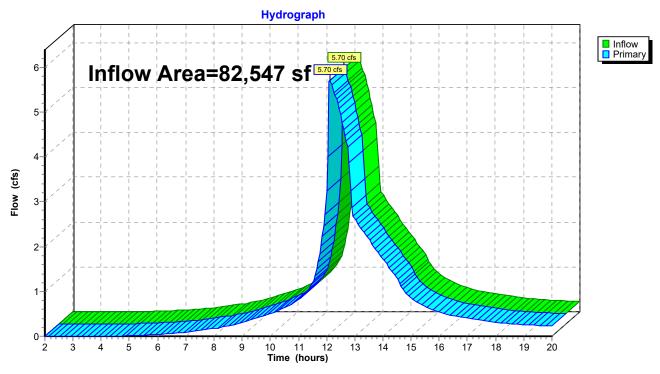
Inflow Area = 82,547 sf, 83.09% Impervious, Inflow Depth > 6.75" for 50-Year event

Inflow = 5.70 cfs @ 12.13 hrs, Volume= 46,466 cf

Primary = 5.70 cfs @ 12.13 hrs, Volume= 46,466 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-3: Arlington High School



Primary (cfs) 1.02 0.85 0.74 0.66 0.59 0.54 0.49 0.46 0.43 0.40 0.38 0.36 0.33 0.31 0.30 0.28 0.27 0.26 0.25 0.25 0.24 0.23

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 80

Hydrograph for Link POA-3: Arlington High School

		-	•		•	•
Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
(hours)	(cfs)	(feet)	(cfs)	(hours)	(cfs)	(feet)
2.00	0.00	0.00	0.00	14.75	1.02	0.00
2.25	0.00	0.00	0.00	15.00	0.85	0.00
2.50	0.00	0.00	0.00	15.25	0.74	0.00
2.75	0.00	0.00	0.00	15.50	0.66	0.00
3.00	0.00	0.00	0.00	15.75	0.59	0.00
3.25	0.00	0.00	0.00	16.00	0.54	0.00
3.50	0.00	0.00	0.00	16.25	0.49	0.00
3.75	0.00	0.00	0.00	16.50	0.46	0.00
4.00	0.00	0.00	0.00	16.75	0.43	0.00
4.25	0.00	0.00	0.00	17.00	0.40	0.00
4.50	0.00	0.00	0.00	17.25	0.38	0.00
4.75	0.01	0.00	0.01	17.50	0.36	0.00
5.00	0.01	0.00	0.01	17.75	0.33	0.00
5.25	0.02	0.00	0.02	18.00	0.31	0.00
5.50	0.02	0.00	0.02	18.25	0.30	0.00
5.75 6.00	0.03 0.04	0.00 0.00	0.03 0.04	18.50 18.75	0.28 0.27	0.00 0.00
6.25	0.04	0.00	0.04	19.00	0.27	0.00
6.50	0.03	0.00	0.06	19.00	0.25	0.00
6.75	0.00	0.00	0.08	19.50	0.25	0.00
7.00	0.09	0.00	0.09	19.75	0.24	0.00
7.25	0.11	0.00	0.11	20.00	0.23	0.00
7.50	0.13	0.00	0.13	20.00	0.20	0.00
7.75	0.15	0.00	0.15			
8.00	0.17	0.00	0.17			
8.25	0.20	0.00	0.20			
8.50	0.23	0.00	0.23			
8.75	0.26	0.00	0.26			
9.00	0.30	0.00	0.30			
9.25	0.35	0.00	0.35			
9.50	0.40	0.00	0.40			
9.75	0.45	0.00	0.45			
10.00	0.50	0.00	0.50			
10.25	0.56	0.00	0.56			
10.50	0.63	0.00	0.63			
10.75	0.72	0.00	0.72			
11.00	0.81	0.00	0.81			
11.25	0.95	0.00	0.95			
11.50	1.19	0.00	1.19			
11.75	1.83	0.00	1.83			
12.00	3.24	0.00	3.24			
12.25	5.43	0.00	5.43			
12.50	4.93	0.00	4.93			
12.75 13.00	4.22 2.62	0.00 0.00	4.22 2.62			
13.00	2.02	0.00	2.02			
13.50	2.16	0.00	2.16			
13.75	1.94	0.00	1.94			
14.00	1.72	0.00	1.72			
14.25	1.51	0.00	1.51			
14.50	1.30	0.00	1.30			
				l		

Proposed Conditions - NOAA ++ Rainfall Type III 24-hr 100-Year Rainfall=10.40" Printed 11/25/2020

Prepared by Weston & Sampson HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 81

Time span=2.00-20.00 hrs, dt=0.05 hrs, 361 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: DA-1 Runoff Area=164,858 sf 94.89% Impervious Runoff Depth>9.33"

Tc=6.0 min CN=95 Runoff=37.49 cfs 128,114 cf

SubcatchmentDA-2: DA-2 Runoff Area=14,034 sf 87.20% Impervious Runoff Depth>8.72"

Tc=6.0 min CN=90 Runoff=3.11 cfs 10,203 cf

SubcatchmentDA-3a: DA-3a Runoff Area=72,161 sf 84.29% Impervious Runoff Depth>8.60"

Tc=6.0 min CN=89 Runoff=15.89 cfs 51,716 cf

SubcatchmentDA-3b: DA-3b Runoff Area=10,386 sf 74.79% Impervious Runoff Depth>7.85"

Tc=6.0 min CN=83 Runoff=2.17 cfs 6,792 cf

Pond DET-1: Underground Detention Peak Elev=64.18' Storage=12,784 cf Inflow=15.89 cfs 51,716 cf

Outflow=10.81 cfs 50,555 cf

Link POA-1: Mill Brook Inflow=37.49 cfs 128,114 cf

Primary=37.49 cfs 128,114 cf

Link POA-2: Grove Street Inflow=3.11 cfs 10,203 cf

Primary=3.11 cfs 10,203 cf

Link POA-3: Arlington High School Inflow=12.07 cfs 57,347 cf

Primary=12.07 cfs 57,347 cf

Total Runoff Area = 261,439 sf Runoff Volume = 196,826 cf Average Runoff Depth = 9.03" 9.24% Pervious = 24,169 sf 90.76% Impervious = 237,270 sf

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

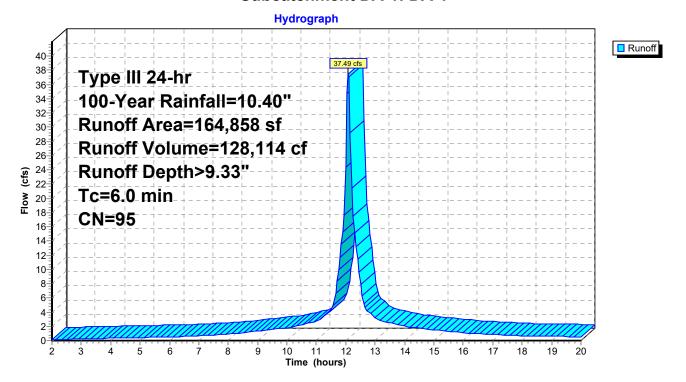
Summary for Subcatchment DA-1: DA-1

Runoff = 37.49 cfs @ 12.09 hrs, Volume= 128,114 cf, Depth> 9.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=10.40"

_	Α	rea (sf)	CN	Description		
Ī		8,417	39	>75% Gras	s cover, Go	Good, HSG A
_	1	56,441	98	Paved park	ing, HSG A	A
	1	64,858	95	Weighted A	verage	
		8,417		5.11% Perv	ious Area	
	1	56,441	,	94.89% Imp	pervious Ar	rea
	Tc	Length	Slope	,	Capacity	·
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	6.0					Direct Entry.

Subcatchment DA-1: DA-1



Runoff (cfs) 1.64 1.53 1.41 1.30 1.18 1.07 1.00 0.95 0.90 0.85 0.80 0.75 0.70 0.65 0.62 0.61 0.59 0.58 0.56 0.55 0.53 0.52

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 83

Hydrograph for Subcatchment DA-1: DA-1

Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00 2.25	0.21 0.23	0.02	0.11 0.14	14.75 15.00	8.78 8.88	8.18
2.23	0.23	0.03 0.04	0.14	15.00	8.98	8.28 8.38
2.75	0.29	0.04	0.10	15.50	9.06	8.46
3.00	0.32	0.06	0.22	15.75	9.14	8.54
3.25	0.35	0.08	0.24	16.00	9.21	8.61
3.50	0.38	0.10	0.27	16.25	9.28	8.68
3.75	0.41	0.11	0.29	16.50	9.34	8.74
4.00	0.45	0.13	0.32	16.75	9.40	8.80
4.25 4.50	0.48 0.52	0.16 0.18	0.34 0.37	17.00 17.25	9.46 9.51	8.86 8.91
4.75	0.55	0.10	0.37	17.50	9.56	8.96
5.00	0.59	0.23	0.41	17.75	9.61	9.00
5.25	0.63	0.26	0.43	18.00	9.65	9.05
5.50	0.67	0.29	0.46	18.25	9.69	9.09
5.75	0.71	0.32	0.48	18.50	9.73	9.13
6.00	0.75	0.35	0.50	18.75	9.77	9.17
6.25 6.50	0.79 0.84	0.39 0.43	0.54 0.59	19.00 19.25	9.81 9.85	9.21 9.24
6.75	0.89	0.43	0.59	19.25	9.88	9.24
7.00	0.94	0.51	0.69	19.75	9.92	9.31
7.25	1.00	0.56	0.74	20.00	9.95	9.35
7.50	1.06	0.61	0.79			
7.75	1.12	0.67	0.85			
8.00	1.19	0.73	0.90			
8.25 8.50	1.26 1.34	0.79 0.86	0.99 1.10			
8.75	1.42	0.86	1.10			
9.00	1.52	1.03	1.34			
9.25	1.62	1.12	1.45			
9.50	1.73	1.22	1.57			
9.75	1.84	1.33	1.69			
10.00	1.97	1.45	1.81			
10.25	2.10 2.25	1.58 1.72	2.00 2.24			
10.50 10.75	2.42	1.72	2.48			
11.00	2.60	2.06	2.72			
11.25	2.82	2.27	3.38			
11.50	3.10	2.55	4.28			
11.75	3.69	3.13	10.03			
12.00	5.20	4.62	24.36			
12.25 12.50	6.71 7.30	6.11 6.71	17.53 7.92			
12.75	7.58	6.98	4.14			
13.00	7.80	7.20	3.22			
13.25	7.98	7.38	2.74			
13.50	8.15	7.55	2.50			
13.75	8.30	7.70	2.26			
14.00 14.25	8.43 8.56	7.83 7.96	2.03 1.87			
14.25	8.67	7.96 8.07	1.87			
14.50	0.07	0.07	1.75			

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

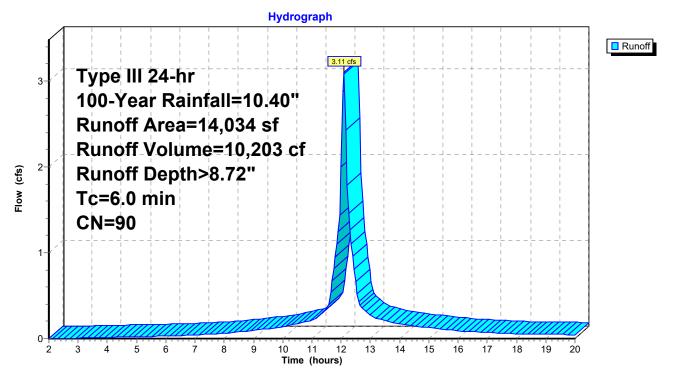
Summary for Subcatchment DA-2: DA-2

Runoff = 3.11 cfs @ 12.09 hrs, Volume= 10,203 cf, Depth> 8.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=10.40"

	Area (sf)	CN	Description			
•	1,796	39	>75% Gras	s cover, Go	lood, HSG A	_
	12,238	98	Paved park	ing, HSG A	A	
	14,034	90	Weighted A	verage		
	1,796		12.80% Pe	rvious Area	a	
	12,238		87.20% lm	pervious Ar	rea	
Tc	Length	Slope	Velocity	Capacity	Description	
(min)	-	(ft/ft)	,	(cfs)	·	
6.0					Direct Entry.	_

Subcatchment DA-2: DA-2



Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Runoff

(cfs) 0.14

0.13

0.12

0.11 0.10

0.09

0.08

0.08

0.08

0.07

0.07

0.06

0.06

0.06

0.05

0.05

0.05

0.05

0.05

0.05 0.05

0.04

Hydrograph for Subcatchment DA-2: DA-2

			, ,	-		
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)
2.00	0.21	0.00	0.00	14.75	8.78	7.58
2.25	0.23	0.00	0.00	15.00	8.88	7.68
2.50	0.26	0.00	0.00	15.25	8.98	7.77
2.75	0.29	0.00	0.00	15.50	9.06	7.85
3.00	0.32	0.01	0.01	15.75	9.14	7.93
3.25	0.35	0.01	0.01	16.00	9.21	8.00
3.50	0.38	0.02	0.01	16.25	9.28	8.07
3.75	0.41	0.03	0.01	16.50	9.34	8.13
4.00	0.45	0.04	0.01	16.75	9.40	8.19
4.25	0.48	0.05	0.01	17.00	9.46	8.24
4.50	0.52	0.06	0.02	17.25	9.51	8.30
4.75	0.55	0.08	0.02	17.50	9.56	8.35
5.00	0.59	0.09	0.02	17.75	9.61	8.39
5.25	0.63	0.11	0.02	18.00	9.65	8.43
5.50	0.67	0.13	0.02	18.25	9.69	8.48
5.75	0.71	0.15	0.03	18.50	9.73	8.52
6.00	0.75	0.17	0.03	18.75	9.77	8.55
6.25 6.50	0.79 0.84	0.19 0.22	0.03 0.04	19.00 19.25	9.81 9.85	8.59 8.63
6.75	0.89	0.22	0.04	19.23	9.88	8.66
7.00	0.89	0.23	0.04	19.75	9.92	8.70
7.25	1.00	0.20	0.05	20.00	9.95	8.73
7.50	1.06	0.36	0.05	20.00	0.00	0.70
7.75	1.12	0.40	0.06			
8.00	1.19	0.45	0.06			
8.25	1.26	0.50	0.07			
8.50	1.34	0.56	0.08			
8.75	1.42	0.62	0.09			
9.00	1.52	0.70	0.10			
9.25	1.62	0.78	0.11			
9.50	1.73	0.86	0.12			
9.75	1.84	0.96	0.13			
10.00	1.97	1.06	0.14			
10.25	2.10	1.18	0.15			
10.50 10.75	2.25 2.42	1.31 1.46	0.17 0.19			
11.00	2.60	1.62	0.13			
11.25	2.82	1.82	0.27			
11.50	3.10	2.08	0.34			
11.75	3.69	2.63	0.81			
12.00	5.20	4.07	2.01			
12.25	6.71	5.53	1.46			
12.50	7.30	6.12	0.66			
12.75	7.58	6.39	0.35			
13.00	7.80	6.61	0.27			
13.25	7.98	6.79	0.23			
13.50	8.15	6.95	0.21			
13.75	8.30	7.10	0.19			
14.00	8.43	7.23	0.17			
14.25	8.56	7.36	0.16			
14.50	8.67	7.47	0.15			

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

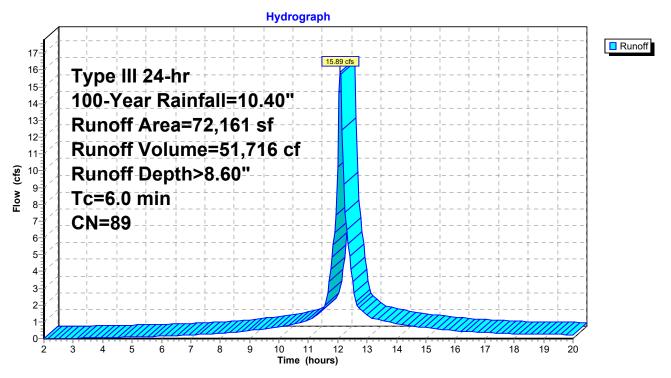
Summary for Subcatchment DA-3a: DA-3a

Runoff = 15.89 cfs @ 12.09 hrs, Volume= 51,716 cf, Depth> 8.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=10.40"

	Area (sf)	CN	Description		
	11,338	39	>75% Gras	s cover, Go	Good, HSG A
	60,823	98	Paved park	ing, HSG A	A
	72,161	89	Weighted A	verage	
	11,338		15.71% Pei	vious Area	a
	60,823		84.29% lmp	pervious Ar	rea
т.		Clana	Valacity	Consoitu	Description
, To	5	Slope	,	Capacity	!
(min) (feet)	(ft/ft)	(ft/sec)	(cfs)	
6.0)				Direct Entry.

Subcatchment DA-3a: DA-3a



Runoff (cfs) 0.71 0.66 0.61 0.56 0.51 0.46 0.43 0.41 0.39 0.37 0.35 0.32 0.30 0.28 0.27 0.26 0.26 0.25 0.24 0.24 0.23 0.23

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 87

Hydrograph for Subcatchment DA-3a: DA-3a

			,			
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00	0.21	0.00	0.00	14.75	8.78	7.46
2.25	0.23	0.00	0.00	15.00	8.88	7.56
2.50	0.26	0.00	0.00	15.25	8.98	7.65
2.75	0.29	0.00	0.01	15.50	9.06	7.73
3.00	0.32	0.00	0.02	15.75	9.14	7.81
3.25	0.35	0.01	0.03	16.00	9.21	7.88
3.50	0.38	0.01	0.04	16.25	9.28	7.95
3.75	0.41	0.02	0.05	16.50	9.34	8.01
4.00 4.25	0.45 0.48	0.03	0.05 0.06	16.75 17.00	9.40 9.46	8.07 8.12
4.23	0.46	0.04 0.05	0.00	17.00	9.40	8.17
4.75	0.55	0.03	0.07	17.23	9.56	8.22
5.00	0.59	0.07	0.09	17.75	9.61	8.27
5.25	0.63	0.09	0.10	18.00	9.65	8.31
5.50	0.67	0.11	0.11	18.25	9.69	8.35
5.75	0.71	0.13	0.12	18.50	9.73	8.39
6.00	0.75	0.14	0.13	18.75	9.77	8.43
6.25	0.79	0.17	0.15	19.00	9.81	8.47
6.50	0.84	0.19	0.17	19.25	9.85	8.50
6.75	0.89	0.22	0.19	19.50	9.88	8.54
7.00	0.94	0.25	0.21	19.75	9.92	8.58
7.25	1.00	0.28	0.23	20.00	9.95	8.61
7.50 7.75	1.06 1.12	0.32	0.25 0.27			
8.00	1.12	0.36 0.40	0.27			
8.25	1.19	0.45	0.33			
8.50	1.34	0.51	0.38			
8.75	1.42	0.57	0.43			
9.00	1.52	0.64	0.47			
9.25	1.62	0.72	0.52			
9.50	1.73	0.81	0.58			
9.75	1.84	0.90	0.63			
10.00	1.97	1.00	0.68			
10.25	2.10	1.11	0.77			
10.50	2.25	1.24	0.87			
10.75	2.42 2.60	1.38 1.54	0.97 1.08			
11.00 11.25	2.82	1.54	1.06			
11.50	3.10	1.74	1.73			
11.75	3.69	2.54	4.12			
12.00	5.20	3.96	10.24			
12.25	6.71	5.42	7.49			
12.50	7.30	6.00	3.40			
12.75	7.58	6.28	1.78			
13.00	7.80	6.49	1.39			
13.25	7.98	6.67	1.18			
13.50	8.15	6.83	1.08			
13.75 14.00	8.30 8.43	6.98 7.11	0.98 0.87			
14.00	8.56	7.11	0.81			
14.25	8.67	7.25	0.81			
1-7.50	0.07	1.55	0.70			

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

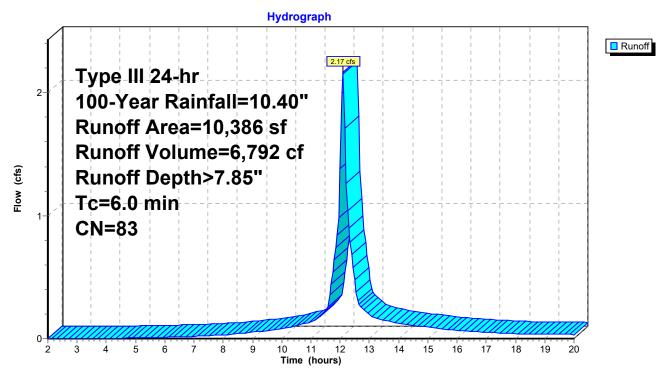
Summary for Subcatchment DA-3b: DA-3b

Runoff = 2.17 cfs @ 12.09 hrs, Volume= 6,792 cf, Depth> 7.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=10.40"

_	Aı	rea (sf)	CN	Description			
_		2,618	39	>75% Gras	s cover, Go	Good, HSG A	
_		7,768	98	Paved park	ing, HSG A	A	
_		10,386	83	Weighted A	verage		
		2,618		25.21% Pervious Area			
		7,768		74.79% lmp	ervious Ar	vrea	
	_		01			5	
	Tc	Length	Slope	,	Capacity	·	
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)		
	6.0					Direct Entry.	

Subcatchment DA-3b: DA-3b



Runoff (cfs) 0.10 0.09 0.09 80.0 0.07 0.07 0.06 0.06 0.05 0.05 0.05 0.05 0.04 0.04 0.04 0.04 0.04 0.04 0.03 0.03 0.03 0.03

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 89

Hydrograph for Subcatchment DA-3b: DA-3b

			, ,	•		
Time	Precip.	Excess	Runoff	Time	Precip.	Excess
(hours)	(inches)	(inches)	(cfs)	(hours)	(inches)	(inches)
2.00 2.25	0.21 0.23	0.00	0.00	14.75 15.00	8.78	6.73
2.23	0.23	0.00	0.00 0.00	15.00	8.88 8.98	6.83 6.92
2.75	0.20	0.00	0.00	15.25	9.06	7.00
3.00	0.23	0.00	0.00	15.75	9.14	7.07
3.25	0.35	0.00	0.00	16.00	9.21	7.14
3.50	0.38	0.00	0.00	16.25	9.28	7.21
3.75	0.41	0.00	0.00	16.50	9.34	7.27
4.00	0.45	0.00	0.00	16.75	9.40	7.32
4.25	0.48	0.00	0.00	17.00	9.46	7.38
4.50	0.52	0.01	0.00	17.25	9.51	7.43
4.75	0.55	0.01	0.00	17.50	9.56	7.48
5.00	0.59	0.01	0.01	17.75	9.61	7.52
5.25	0.63	0.02	0.01	18.00	9.65	7.56
5.50	0.67	0.03	0.01	18.25	9.69	7.60
5.75	0.71	0.04	0.01	18.50	9.73	7.64
6.00	0.75 0.79	0.05 0.06	0.01	18.75	9.77 9.81	7.68 7.72
6.25 6.50	0.79	0.00	0.01 0.01	19.00 19.25	9.85	7.75
6.75	0.89	0.07	0.02	19.50	9.88	7.79
7.00	0.03	0.03	0.02	19.75	9.92	7.82
7.25	1.00	0.13	0.02	20.00	9.95	7.86
7.50	1.06	0.16	0.02		0.00	
7.75	1.12	0.18	0.03			
8.00	1.19	0.21	0.03			
8.25	1.26	0.25	0.03			
8.50	1.34	0.29	0.04			
8.75	1.42	0.33	0.05			
9.00	1.52	0.39	0.05			
9.25	1.62	0.45	0.06			
9.50 9.75	1.73 1.84	0.51 0.59	0.07 0.07			
10.00	1.97	0.59	0.07			
10.00	2.10	0.76	0.09			
10.50	2.25	0.87	0.10			
10.75	2.42	0.99	0.12			
11.00	2.60	1.13	0.13			
11.25	2.82	1.30	0.17			
11.50	3.10	1.53	0.22			
11.75	3.69	2.02	0.54			
12.00	5.20	3.36	1.38			
12.25	6.71	4.75	1.04			
12.50	7.30	5.31	0.47			
12.75 13.00	7.58 7.80	5.58 5.79	0.25 0.19			
13.25	7.98	5.79	0.19			
13.50	8.15	6.12	0.17			
13.75	8.30	6.26	0.14			
14.00	8.43	6.39	0.12			
14.25	8.56	6.51	0.11			
14.50	8.67	6.62	0.11			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 90

Summary for Pond DET-1: Underground Detention System

72,161 sf, 84.29% Impervious, Inflow Depth > 8.60" for 100-Year event Inflow Area =

15.89 cfs @ 12.09 hrs, Volume= Inflow 51,716 cf

Outflow 10.81 cfs @ 12.20 hrs, Volume= 50,555 cf, Atten= 32%, Lag= 6.9 min

Primary 10.81 cfs @ 12.20 hrs, Volume= 50,555 cf

Routing by Stor-Ind method, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 64.18' @ 12.15 hrs Storage= 12,784 cf

Plug-Flow detention time= 47.0 min calculated for 50,555 cf (98% of inflow)

Center-of-Mass det. time= 37.5 min (780.5 - 743.0)

Volume	Invert	Avail.Storage	Storage Description
#1	60.60'	7,672 cf	Oldcastle StormCapture SC1 3'x 24
			Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
			Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf
			4 Rows adjusted for 32.0 cf perimeter wall
#2	60.60'	5,112 cf	Oldcastle StormCapture SC1 3'x 16
			Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
			Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf
			4 Rows adjusted for 24.0 cf perimeter wall
		40.704.6	T 1 1 4 11 11 01

12,784 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	64.18'	Automatic Storage Overflow (Discharged without head)
#1	Primary	60.60'	12.0" Round Culvert
			L= 100.0' CMP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 60.60' / 59.40' S= 0.0120 '/' Cc= 0.900
			n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	60.60'	6.0" Vert. Orifice/Grate X 2.00 C= 0.600
			Limited to weir flow at low heads
#3	Device 1	62.60'	4.0' long x 0.5' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.24 cfs @ 12.20 hrs HW=64.18' (Free Discharge)

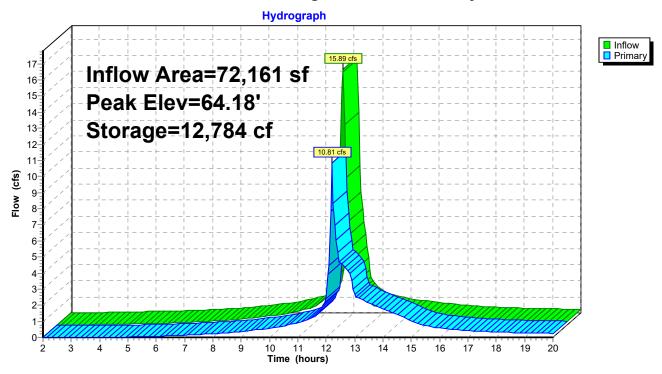
-1=Culvert (Inlet Controls 5.24 cfs @ 6.67 fps)

2=Orifice/Grate (Passes < 3.45 cfs potential flow)

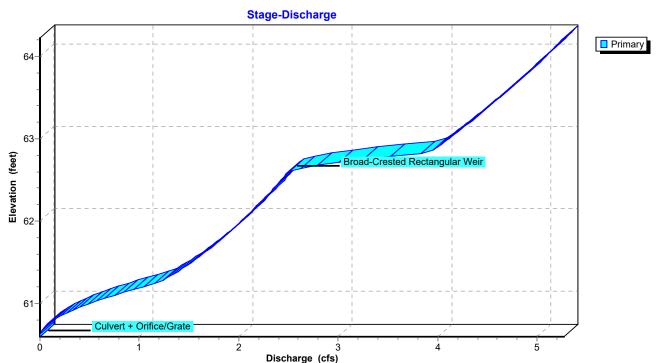
-3=Broad-Crested Rectangular Weir (Passes < 26.46 cfs potential flow)

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Pond DET-1: Underground Detention System



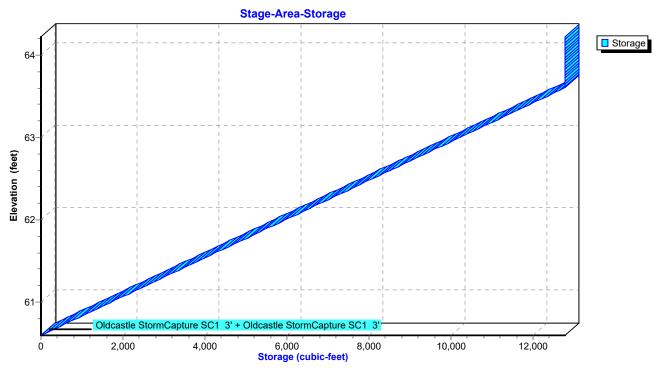
Pond DET-1: Underground Detention System



Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 92

Pond DET-1: Underground Detention System



Prepared by Weston & Sampson
HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 93

Hydrograph for Pond DET-1: Underground Detention System

Time	Inflow	Storage	Elevation	Primary
(hours)	(cfs)	(cubic-feet)	(feet)	(cfs)
2.00	0.00	0	60.60	0.00
2.50	0.00	0	60.60	0.00
3.00	0.02	17	60.60	0.00
3.50	0.04	64	60.62	0.00
4.00	0.05	141	60.63	0.00
4.50	0.07	243	60.66	0.01
5.00	0.09	361	60.68	0.03
5.50	0.11	485	60.71	0.05
6.00	0.13	604	60.74	0.07
6.50	0.17	722	60.77	0.10
7.00	0.21	851	60.80	0.13
7.50	0.25	983	60.83	0.18
8.00	0.30	1,114	60.86	0.23
8.50	0.38	1,260	60.90	0.28
9.00	0.47	1,443	60.94	0.37
9.50	0.58	1,641	60.99	0.47
10.00	0.68	1,839	61.03	0.57
10.50	0.87	2,074	61.09	0.71
11.00	1.08	2,375	61.16	0.90
11.50	1.73	2,934	61.29	1.25
12.00	10.24	7,932	62.46	2.40
12.50	3.40	12,539	63.54	4.67
13.00	1.39	8,747	62.65	2.68
13.50	1.08	6,647	62.16	2.16
14.00	0.87	4,852	61.74	1.78
14.50	0.76	3,438	61.41	1.41
15.00	0.66	2,516	61.19	1.00
15.50	0.56	2,097	61.09	0.73
16.00	0.46	1,852	61.03	0.58
16.50	0.41	1,679	60.99	0.49
17.00	0.37	1,562	60.97	0.43
17.50	0.32	1,465	60.94	0.38
18.00	0.28	1,372	60.92	0.33
18.50	0.26	1,293	60.90	0.30
19.00	0.25	1,240	60.89	0.28
19.50	0.24	1,200	60.88	0.26
20.00	0.23	1,163	60.87	0.24

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 94

Summary for Link POA-1: Mill Brook

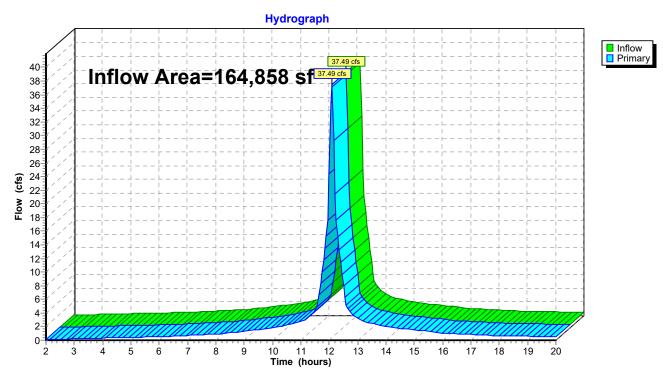
Inflow Area = 164,858 sf, 94.89% Impervious, Inflow Depth > 9.33" for 100-Year event

Inflow = 37.49 cfs @ 12.09 hrs, Volume= 128,114 cf

Primary = 37.49 cfs @ 12.09 hrs, Volume= 128,114 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-1: Mill Brook



Primary

(cfs) 1.64

1.53

1.41

1.30

1.18 1.07

1.00

0.95

0.90

0.85

0.80

0.75

0.70

0.65

0.62 0.61

0.59

0.58

0.56

0.55

0.53

0.52

Page 95

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Hydrograph for Link POA-1: Mill Brook

Time (hours) Inflow (cfs) Elevation (feet) Primary (cfs) Time (hours) Inflow (cfs) Elevation (feet) 2.00 0.11 0.00 0.11 1.4.75 1.64 (feet) 2.25 0.14 0.00 0.14 15.00 1.53 0.00 2.55 0.16 0.00 0.16 15.25 1.41 0.00 3.00 0.22 0.00 0.22 15.75 1.18 0.00 3.25 0.24 0.00 0.24 16.00 1.07 0.00 3.75 0.29 0.00 0.29 16.50 0.95 0.00 4.00 0.32 0.00 0.32 16.75 0.90 0.00 4.25 0.34 0.00 0.34 17.00 0.85 0.00 4.75 0.39 0.00 0.37 17.25 0.80 0.00 4.75 0.33 0.00 0.37 17.75 0.80 0.00 4.75 0.39 <t< th=""><th></th><th></th><th></th><th>ya.og.ap</th><th>311 101 Enin</th><th> OA</th><th> B. 661</th></t<>				ya.og.ap	311 101 Enin	OA	B. 661
Chours C(fs) C(f	Time	Inflow	Elevation	Primary	Time	Inflow	Elevation
2.25		(cfs)	(feet)			(cfs)	(feet)
2.50	2.00	0.11	0.00	0.11	14.75	1.64	0.00
2.75		0.14	0.00	0.14	15.00		
3.00 0.22 0.00 0.22 15.75 1.18 0.00 3.25 0.24 0.00 0.24 16.00 1.07 0.00 3.50 0.27 0.00 0.27 16.25 1.00 0.00 3.75 0.29 0.00 0.29 16.50 0.95 0.00 4.00 0.32 0.00 0.32 16.75 0.90 0.00 4.25 0.34 0.00 0.34 17.00 0.85 0.00 4.50 0.37 0.00 0.37 17.25 0.80 0.00 5.00 0.41 0.00 0.41 17.75 0.70 0.00 5.25 0.43 0.00 0.44 18.00 0.65 0.00 5.50 0.46 0.00 0.46 18.25 0.62 0.00 6.00 0.50 0.00 0.50 18.75 0.59 0.00 6.25 0.54 0.00 0.54 19.00 0.58 0.00 6.75 0.64 0.00 0.59 19.25 0.56 0.00 6.75 0.64 0.00 0.64 19.50 0.55 0.00 6.75 0.64 0.00 0.64 19.50 0.55 0.00 6.75 0.64 0.00 0.69 19.75 0.55 0.00 6.75 0.64 0.00 0.69 19.75 0.55 0.00 6.75 0.64 0.00 0.69 19.75 0.53 0.00 6.75 0.69 0.00 0.59 19.25 0.56 0.00 6.75 0.69 0.00 0.69 19.75 0.53 0.00 6.75 0.74 0.00 0.74 20.00 0.52 20.00 6.75 0.74 0.00 0.79 17.75 0.53 0.00 6.75 0.74 0.00 0.74 20.00 0.52 21.22 29.00 1.34 0.00 1.81 0.00 1.81 0.00 1.81 0.00 1.81 0.00 1.81 0.00 1.81 0.00 1.81 0.00 1.81 0.00 1.81 0.00 2.48 11.57 0.00 0.52 2.24 0.00 2.24 11.25 3.38 0.00 2.48 11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.00 24.36 0.00 2.436 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.30 3.22 0.00 3.22 13.25 2.74 0.00 2.26 14.00 2.03 14.25 1.87 0.00 2.03 14.25 1.87 0.00 2.00 1.37		0.16	0.00	0.16	15.25		0.00
3.25							
3.50							
3.75 0.29 0.00 0.29 16.50 0.95 0.00 4.00 0.32 0.00 0.32 16.75 0.90 0.00 4.25 0.34 0.00 0.34 17.00 0.85 0.00 4.50 0.37 0.00 0.37 17.25 0.80 0.00 4.75 0.39 0.00 0.39 17.50 0.75 0.00 5.00 0.41 0.00 0.41 17.75 0.70 0.00 5.50 0.43 0.00 0.43 18.00 0.65 0.00 5.50 0.46 0.00 0.46 18.25 0.62 0.00 5.50 0.48 0.00 0.48 18.50 0.61 0.00 5.50 0.48 0.00 0.54 18.75 0.59 0.00 6.50 0.59 0.00 0.59 19.25 0.56 0.00 6.75 0.64 0.00 0.64 19.50 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>							
4.00 0.32 0.00 0.32 16.75 0.90 0.00 4.25 0.34 0.00 0.37 17.00 0.85 0.00 4.75 0.39 0.00 0.39 17.50 0.75 0.00 5.00 0.41 0.00 0.41 17.75 0.70 0.00 5.25 0.43 0.00 0.43 18.00 0.65 0.00 5.50 0.46 0.00 0.46 18.25 0.62 0.00 5.75 0.48 0.00 0.48 18.50 0.61 0.00 6.00 0.50 0.00 0.50 18.75 0.59 0.00 6.25 0.54 0.00 0.54 19.00 0.58 0.00 6.50 0.59 0.00 0.59 19.25 0.56 0.00 6.75 0.64 0.00 0.64 19.50 0.55 0.00 7.05 0.79 0.00 0.79 19.75 0.53 0.00 7.50 0.79 0.00 0.79 19.75							
4.25 0.34 0.00 0.37 17.25 0.80 0.00 4.75 0.39 0.00 0.39 17.25 0.80 0.00 5.00 0.41 0.00 0.41 17.75 0.70 0.00 5.25 0.43 0.00 0.43 18.00 0.65 0.00 5.50 0.46 0.00 0.46 18.25 0.62 0.00 5.75 0.48 0.00 0.48 18.50 0.61 0.00 6.00 0.50 0.00 0.50 18.75 0.59 0.00 6.25 0.54 0.00 0.54 19.00 0.58 0.00 6.50 0.59 0.00 0.59 19.25 0.59 0.00 6.75 0.64 0.00 0.64 19.50 0.55 0.00 7.00 0.69 0.00 0.69 19.75 0.53 0.00 7.50 0.79 0.00 0.79 2.75 0.85 0.00 0.85 8.00 1.10 0.00 1.10							
4.50 0.37 0.00 0.39 17.25 0.80 0.00 4.75 0.39 0.00 0.39 17.50 0.75 0.00 5.00 0.41 0.00 0.41 17.75 0.70 0.00 5.25 0.43 0.00 0.43 18.00 0.65 0.00 5.50 0.46 0.00 0.46 18.25 0.62 0.00 5.75 0.48 0.00 0.48 18.50 0.61 0.00 6.00 0.50 0.00 0.50 18.75 0.59 0.00 6.50 0.59 0.00 0.54 19.00 0.58 0.00 6.50 0.59 0.00 0.59 19.25 0.56 0.00 6.75 0.64 0.00 0.64 19.50 0.55 0.00 7.25 0.74 0.00 0.79 19.75 0.53 0.00 7.50 0.79 0.00 0.99 8.25 0.99 0.00 1.85 8.00 1.34 0.00 1.81							
4.75 0.39 0.00 0.39 17.50 0.75 0.00 5.00 0.41 0.00 0.41 17.75 0.70 0.00 5.25 0.43 0.00 0.43 18.00 0.65 0.00 5.50 0.46 0.00 0.46 18.25 0.62 0.00 5.75 0.48 0.00 0.48 18.50 0.61 0.00 6.00 0.50 0.00 0.50 18.75 0.59 0.00 6.25 0.54 0.00 0.54 19.00 0.58 0.00 6.50 0.59 0.00 0.59 19.25 0.56 0.00 6.75 0.64 0.00 0.64 19.50 0.55 0.00 7.00 0.69 0.00 0.74 20.00 0.52 0.00 7.50 0.79 0.00 0.79 27.5 0.53 0.00 8.25 0.99 0.00 0.85 0.00 0.52 0.00 8.50 1.10 0.00 1.69 0.00 <							
5.00 0.41 0.00 0.41 17.75 0.70 0.00 5.25 0.43 0.00 0.43 18.00 0.65 0.00 5.50 0.46 0.00 0.46 18.25 0.62 0.00 5.75 0.48 0.00 0.48 18.50 0.61 0.00 6.00 0.50 0.00 0.54 19.00 0.58 0.00 6.50 0.59 0.00 0.54 19.00 0.58 0.00 6.50 0.59 0.00 0.64 19.50 0.58 0.00 6.75 0.64 0.00 0.64 19.50 0.55 0.00 7.00 0.69 0.00 0.69 19.75 0.53 0.00 7.25 0.74 0.00 0.74 20.00 0.52 0.00 7.75 0.85 0.00 0.85 8.00 0.99 0.00 0.99 8.50 1.10 0.00 1.34 0.00 1.45 9.50 1.57 9.51 1.69 1.69 1.69							
5.25 0.43 0.00 0.43 18.00 0.65 0.00 5.50 0.46 0.00 0.46 18.25 0.62 0.00 5.75 0.48 0.00 0.48 18.50 0.61 0.05 6.00 0.50 0.00 0.50 18.75 0.59 0.00 6.25 0.54 0.00 0.54 19.00 0.58 0.00 6.50 0.59 0.00 0.59 19.25 0.56 0.00 6.75 0.64 0.00 0.64 19.50 0.55 0.00 7.00 0.69 0.00 0.69 19.75 0.53 0.00 7.25 0.74 0.00 0.74 20.00 0.52 0.00 7.50 0.79 0.00 0.79 0.75 0.53 0.00 7.50 0.85 0.00 0.85 8.00 0.90 8.25 0.99 0.00 0.99 8.25 0.99 0.00 1.22 9.00 1.34 9.00 1.45 9.50 1.57 <							
5.50 0.46 0.00 0.46 18.25 0.62 0.00 5.75 0.48 0.00 0.48 18.50 0.61 0.00 6.00 0.50 0.00 0.50 18.75 0.59 0.00 6.50 0.59 0.00 0.59 19.25 0.56 0.00 6.75 0.64 0.00 0.64 19.50 0.55 0.00 7.00 0.69 0.00 0.69 19.75 0.53 0.00 7.25 0.74 0.00 0.74 20.00 0.52 0.00 7.50 0.79 0.00 0.79 20.00 0.52 0.00 8.00 0.90 0.00 0.90 0.85 8.00 0.90 0.00 0.99 8.55 1.10 0.00 1.45 0.90 1.45 9.50 1.57 0.00 1.57 9.75 1.69 0.00 1.69 10.00 1.81 10.02 1.22 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00							
5.75 0.48 0.00 0.48 18.50 0.61 0.00 6.00 0.50 0.00 0.50 18.75 0.59 0.00 6.50 0.59 0.00 0.54 19.00 0.58 0.00 6.50 0.59 0.00 0.64 19.25 0.56 0.00 6.75 0.64 0.00 0.64 19.50 0.55 0.00 7.00 0.69 0.00 0.69 19.75 0.53 0.00 7.25 0.74 0.00 0.74 20.00 0.52 0.00 7.75 0.85 0.00 0.85 8.00 0.90 0.00 0.99 8.50 1.10 0.00 1.10 0.00 1.22 9.00 1.34 9.25 1.45 0.00 1.45 9.50 1.57 0.00 1.57 9.75 1.69 0.00 1.81 10.25 2.00 0.00 2.24 10.00 2.24 10.00 2.24							
6.00							
6.25 0.54 0.00 0.54 19.00 0.58 0.00 6.50 0.59 0.00 0.59 19.25 0.56 0.00 6.75 0.64 0.00 0.64 19.50 0.55 0.00 7.00 0.69 0.00 0.69 19.75 0.53 0.00 7.25 0.74 0.00 0.74 20.00 0.52 0.00 7.50 0.79 0.00 0.79 0.00 0.52 0.00 7.50 0.79 0.00 0.85 0.00 0.85 0.00 0.52 0.00 8.25 0.99 0.00 0.99 8.50 1.10 0.00 1.10 8.75 1.22 0.00 1.22 9.00 1.34 0.00 1.45 9.50 1.57 0.00 1.57 9.75 1.69 0.00 1.69 10.00 1.81 10.02 2.24 0.00 2.48 11.00 2.72 0.00 2.72 11.25							
6.50 0.59 0.00 0.59 19.25 0.56 0.00 6.75 0.64 0.00 0.64 19.50 0.55 0.00 7.00 0.69 0.00 0.69 19.75 0.53 0.00 7.25 0.74 0.00 0.74 20.00 0.52 0.00 7.50 0.79 0.00 0.79 0.52 0.00 0.52 0.00 7.75 0.85 0.00 0.85 8.00 0.90 0.00 0.99 8.55 0.99 0.00 0.99 8.55 1.10 0.00 1.10 8.75 1.22 0.00 1.22 9.00 1.34 0.00 1.34 9.25 1.45 0.00 1.45 9.50 1.57 0.00 1.57 9.75 1.69 0.00 1.69 10.00 1.81 10.02 2.24 0.00 2.24 10.75 2.48 0.00 2.48 11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 10.03 10.03 12.25 17.53<							
6.75 0.64 0.00 0.64 19.50 0.55 0.00 7.00 0.69 0.00 0.69 19.75 0.53 0.00 7.25 0.74 0.00 0.74 20.00 0.52 0.00 7.50 0.79 0.00 0.79 0.75 0.85 0.00 0.85 8.00 0.90 0.90 8.50 0.00 0.90 0.90 8.25 0.99 0.00 0.99 8.50 1.10 0.00 1.10 8.75 1.22 0.00 1.22 9.00 1.34 0.00 1.45 9.50 1.57 0.00 1.57 9.75 1.69 0.00 1.69 10.00 1.81 0.00 1.81 10.25 2.00 0.00 2.00 10.50 2.24 0.00 2.248 11.00 2.72 11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.25 17.53 10.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>							
7.00 0.69 0.00 0.69 19.75 0.53 0.00 7.25 0.74 0.00 0.74 20.00 0.52 0.00 7.50 0.79 0.00 0.79 0.00 0.79 0.00 0.90 8.00 0.90 0.00 0.90 1.81 0.00 1.81 0.00 1.81 0.00 2.48 0.00 2.48 0.00 2.48 0.00 2.48 0.00 0.00 0.00 0.00 0.00							
7.25 0.74 0.00 0.74 20.00 0.52 0.00 7.50 0.79 0.00 0.79 0.00 0.79 0.00 0.79 7.75 0.85 0.00 0.90 0.00 0.90 0.85 0.00 0.99 0.00 0.99 0.00 0.99 0.00 0.99 0.00 0.99 0.00 0.99 0.00 0.00 0.99 0.00 1.69 0.00 1.69 0.00 1.69 0.00 1.69 0.00 1.69 0.00 1.69 0.00 1.69 0.00 1.69 0.00 1.69 0.00 1.69 0.00 0.00 2.00 0.00 0.00 2.00 0.00 0.00 0.00 2.00 0.00 0.00 2.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00							
7.50 0.79 0.00 0.79 7.75 0.85 0.00 0.85 8.00 0.90 0.00 0.90 8.25 0.99 0.00 0.99 8.50 1.10 0.00 1.10 8.75 1.22 0.00 1.22 9.00 1.34 0.00 1.34 9.25 1.45 0.00 1.45 9.50 1.57 0.00 1.57 9.75 1.69 0.00 1.69 10.00 1.81 0.00 1.81 10.25 2.00 0.00 2.00 10.50 2.24 0.00 2.48 11.00 2.72 0.00 2.72 11.25 3.38 0.00 3.38 11.75 10.03 0.00 4.28 11.75 10.03 0.00 17.53 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 2.74 13.50 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>							
7.75 0.85 0.00 0.85 8.00 0.90 0.00 0.90 8.25 0.99 0.00 0.99 8.50 1.10 0.00 1.10 8.75 1.22 0.00 1.22 9.00 1.34 0.00 1.34 9.25 1.45 0.00 1.57 9.75 1.69 0.00 1.69 10.00 1.81 0.00 1.81 10.25 2.00 0.00 2.00 10.50 2.24 0.00 2.24 10.75 2.48 0.00 2.48 11.00 2.72 0.00 2.72 11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.75 <t< td=""><td></td><td></td><td></td><td></td><td></td><td>0.02</td><td>0.00</td></t<>						0.02	0.00
8.00 0.90 0.00 0.90 8.25 0.99 0.00 0.99 8.50 1.10 0.00 1.10 8.75 1.22 0.00 1.22 9.00 1.34 0.00 1.34 9.25 1.45 0.00 1.45 9.50 1.57 0.00 1.57 9.75 1.69 0.00 1.69 10.00 1.81 0.00 1.81 10.25 2.00 0.00 2.00 10.50 2.24 0.00 2.24 10.75 2.48 0.00 2.48 11.00 2.72 0.00 2.72 11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.50 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>							
8.25 0.99 0.00 0.99 8.50 1.10 0.00 1.10 8.75 1.22 0.00 1.22 9.00 1.34 0.00 1.34 9.25 1.45 0.00 1.45 9.50 1.57 0.00 1.57 9.75 1.69 0.00 1.69 10.00 1.81 0.00 2.00 10.55 2.00 0.00 2.00 10.50 2.24 0.00 2.24 10.75 2.48 0.00 2.48 11.00 2.72 0.00 2.72 11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.00 24.36 0.00 24.36 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25							
8.75 1.22 0.00 1.22 9.00 1.34 0.00 1.34 9.25 1.45 0.00 1.45 9.50 1.57 0.00 1.57 9.75 1.69 0.00 1.69 10.00 1.81 0.00 1.81 10.25 2.00 0.00 2.00 10.50 2.24 0.00 2.48 11.00 2.72 0.00 2.72 11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 0.00 17.53 12.00 24.36 0.00 24.36 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 1.87							
9.00 1.34 0.00 1.34 9.25 1.45 0.00 1.45 9.50 1.57 0.00 1.57 9.75 1.69 0.00 1.69 10.00 1.81 0.00 2.00 10.50 2.24 0.00 2.24 10.75 2.48 0.00 2.48 11.00 2.72 0.00 2.72 11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.00 24.36 0.00 24.36 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 1.87	8.50	1.10	0.00	1.10			
9.25 1.45 0.00 1.45 9.50 1.57 0.00 1.57 9.75 1.69 0.00 1.69 10.00 1.81 0.00 1.81 10.25 2.00 0.00 2.00 10.50 2.24 0.00 2.24 10.75 2.48 0.00 2.48 11.00 2.72 0.00 2.72 11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.00 24.36 0.00 24.36 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.03 14.25 1.87 0.00 1.87	8.75		0.00				
9.50 1.57 0.00 1.57 9.75 1.69 0.00 1.69 10.00 1.81 0.00 1.81 10.25 2.00 0.00 2.00 10.50 2.24 0.00 2.48 10.75 2.48 0.00 2.48 11.00 2.72 0.00 2.72 11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.00 24.36 0.00 24.36 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
9.75 1.69 0.00 1.69 10.00 1.81 0.00 1.81 10.25 2.00 0.00 2.00 10.50 2.24 0.00 2.24 10.75 2.48 0.00 2.48 11.00 2.72 0.00 2.72 11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.00 24.36 0.00 24.36 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
10.00 1.81 0.00 1.81 10.25 2.00 0.00 2.00 10.50 2.24 0.00 2.24 10.75 2.48 0.00 2.48 11.00 2.72 0.00 2.72 11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.00 24.36 0.00 24.36 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
10.25 2.00 0.00 2.00 10.50 2.24 0.00 2.24 10.75 2.48 0.00 2.48 11.00 2.72 0.00 2.72 11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.00 24.36 0.00 24.36 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
10.50 2.24 0.00 2.24 10.75 2.48 0.00 2.48 11.00 2.72 0.00 2.72 11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.00 24.36 0.00 24.36 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
10.75 2.48 0.00 2.48 11.00 2.72 0.00 2.72 11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.00 24.36 0.00 24.36 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
11.00 2.72 0.00 2.72 11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.00 24.36 0.00 24.36 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
11.25 3.38 0.00 3.38 11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.00 24.36 0.00 24.36 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
11.50 4.28 0.00 4.28 11.75 10.03 0.00 10.03 12.00 24.36 0.00 24.36 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
11.75 10.03 0.00 10.03 12.00 24.36 0.00 24.36 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
12.00 24.36 0.00 24.36 12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
12.25 17.53 0.00 17.53 12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
12.50 7.92 0.00 7.92 12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
12.75 4.14 0.00 4.14 13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87	-						
13.00 3.22 0.00 3.22 13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
13.25 2.74 0.00 2.74 13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
13.50 2.50 0.00 2.50 13.75 2.26 0.00 2.26 14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87							
14.00 2.03 0.00 2.03 14.25 1.87 0.00 1.87	13.50						
14.25 1.87 0.00 1.87	13.75		0.00	2.26			
14.50 1.75 0.00 1.75	14.50	1.75	0.00	1.75			

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 96

Summary for Link POA-2: Grove Street

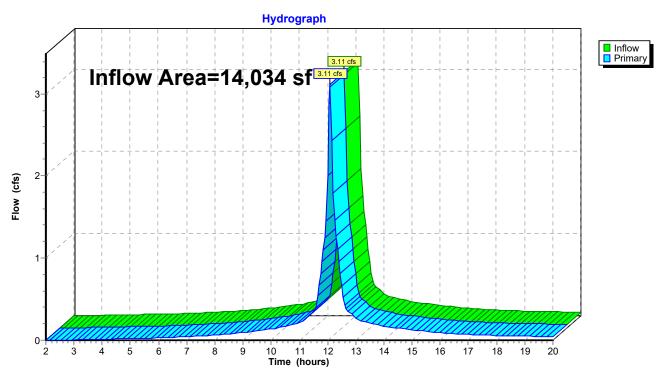
Inflow Area = 14,034 sf, 87.20% Impervious, Inflow Depth > 8.72" for 100-Year event

Inflow = 3.11 cfs @ 12.09 hrs, Volume= 10,203 cf

Primary = 3.11 cfs @ 12.09 hrs, Volume= 10,203 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-2: Grove Street



Primary

(cfs)

0.14

0.13

0.12

0.11

0.10 0.09

0.08

0.08

0.08

0.07

0.07

0.06

0.06

0.06

0.05

0.05

0.05

0.05

0.05

0.05

0.05

0.04

Page 97

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Hydrograph for Link POA-2: Grove Street

Inflow

(cfs)

0.14 0.13

0.12

0.11

0.10

0.09

0.08

0.08

0.08

0.07

0.07

0.06

0.06

0.06

0.05

0.05

0.05

0.05

0.05

0.05

0.05

0.04

Elevation

(feet)

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

Time	Inflow	Elevation	Primary	Time
(hours)	(cfs)	(feet)	(cfs)	(hours)
2.00 2.25	0.00	0.00 0.00	0.00 0.00	14.75 15.00
2.50	0.00	0.00	0.00	15.00
2.75	0.00	0.00	0.00	15.50
3.00	0.01	0.00	0.00	15.75
3.25	0.01	0.00	0.01	16.00
3.50	0.01	0.00	0.01	16.25
3.75	0.01	0.00	0.01	16.50
4.00	0.01	0.00	0.01	16.75
4.25	0.01	0.00	0.01	17.00
4.50	0.02	0.00	0.02	17.25
4.75	0.02	0.00	0.02	17.50
5.00	0.02	0.00	0.02	17.75
5.25	0.02	0.00	0.02	18.00
5.50 5.75	0.02 0.03	0.00 0.00	0.02	18.25
6.00	0.03	0.00	0.03 0.03	18.50 18.75
6.25	0.03	0.00	0.03	19.00
6.50	0.04	0.00	0.03	19.25
6.75	0.04	0.00	0.04	19.50
7.00	0.04	0.00	0.04	19.75
7.25	0.05	0.00	0.05	20.00
7.50	0.05	0.00	0.05	
7.75	0.06	0.00	0.06	
8.00	0.06	0.00	0.06	
8.25	0.07	0.00	0.07	
8.50	0.08	0.00	0.08	
8.75	0.09	0.00	0.09	
9.00	0.10	0.00	0.10	
9.25 9.50	0.11 0.12	0.00 0.00	0.11 0.12	
9.75	0.12	0.00	0.12	
10.00	0.13	0.00	0.13	
10.25	0.15	0.00	0.15	
10.50	0.17	0.00	0.17	
10.75	0.19	0.00	0.19	
11.00	0.21	0.00	0.21	
11.25	0.27	0.00	0.27	
11.50	0.34	0.00	0.34	
11.75	0.81	0.00	0.81	
12.00	2.01	0.00	2.01	
12.25 12.50	1.46	0.00 0.00	1.46 0.66	
12.50	0.66 0.35	0.00	0.86	
13.00	0.33	0.00	0.33	
13.25	0.23	0.00	0.23	
13.50	0.21	0.00	0.21	
13.75	0.19	0.00	0.19	
14.00	0.17	0.00	0.17	
14.25	0.16	0.00	0.16	
14.50	0.15	0.00	0.15	

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 98

Summary for Link POA-3: Arlington High School

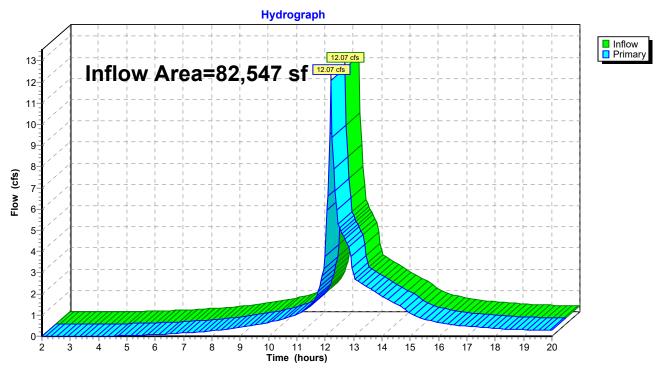
Inflow Area = 82,547 sf, 83.09% Impervious, Inflow Depth > 8.34" for 100-Year event

Inflow = 12.07 cfs @ 12.20 hrs, Volume= 57,347 cf

Primary = 12.07 cfs @ 12.20 hrs, Volume= 57,347 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-20.00 hrs, dt= 0.05 hrs

Link POA-3: Arlington High School



Primary

(cfs)

1.34 1.09

0.92

0.80

0.72 0.65

0.59

0.54

0.51

0.48

0.45

0.42

0.40

0.37 0.35

0.34

0.32

0.31

0.30

0.29

0.28 0.28

Arlington-PR - NOAA 14+

Prepared by Weston & Sampson

HydroCAD® 10.10-3a s/n 02058 © 2020 HydroCAD Software Solutions LLC

Page 99

Hydrograph for Link POA-3: Arlington High School

		-	•		•	•
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)
2.00	0.00	0.00	0.00	14.75	1.34	0.00
2.25	0.00	0.00	0.00	15.00	1.09	0.00
2.50	0.00	0.00	0.00	15.25	0.92	0.00
2.75	0.00	0.00	0.00	15.50	0.80	0.00
3.00	0.00	0.00	0.00	15.75	0.72	0.00
3.25	0.00	0.00	0.00	16.00	0.65	0.00
3.50	0.00	0.00	0.00	16.25	0.59	0.00
3.75	0.00	0.00	0.00	16.50	0.54	0.00
4.00	0.00	0.00	0.00	16.75	0.51	0.00
4.25	0.01	0.00	0.01	17.00	0.48	0.00
4.50	0.02	0.00	0.02	17.25	0.45	0.00
4.75	0.02	0.00	0.02	17.50	0.42	0.00
5.00	0.03	0.00	0.03	17.75	0.40	0.00
5.25	0.04	0.00	0.04	18.00	0.37	0.00
5.50	0.05	0.00	0.05	18.25	0.35	0.00
5.75	0.07	0.00	0.07	18.50	0.34	0.00
6.00	0.08	0.00	0.08	18.75	0.32	0.00
6.25	0.10	0.00	0.10	19.00	0.31	0.00
6.50	0.11	0.00	0.11	19.25	0.30	0.00
6.75	0.13	0.00	0.13	19.50	0.29	0.00
7.00	0.15	0.00	0.15	19.75	0.28	0.00
7.25	0.18	0.00	0.18	20.00	0.28	0.00
7.50	0.20	0.00	0.20			
7.75	0.23	0.00	0.23			
8.00	0.26	0.00	0.26			
8.25	0.29	0.00	0.29			
8.50	0.32	0.00	0.32			
8.75	0.37	0.00	0.37			
9.00	0.42	0.00	0.42			
9.25	0.47	0.00	0.47			
9.50 9.75	0.53 0.59	0.00 0.00	0.53 0.59			
10.00	0.59	0.00	0.59			
10.00	0.03	0.00	0.03			
10.50	0.73	0.00	0.73			
10.75	0.92	0.00	0.92			
11.00	1.04	0.00	1.04			
11.25	1.21	0.00	1.21			
11.50	1.47	0.00	1.47			
11.75	2.12	0.00	2.12			
12.00	3.78	0.00	3.78			
12.25	9.37	0.00	9.37			
12.50	5.14	0.00	5.14			
12.75	4.45	0.00	4.45			
13.00	2.87	0.00	2.87			
13.25	2.52	0.00	2.52			
13.50	2.31	0.00	2.31			
13.75	2.11	0.00	2.11			
14.00	1.90	0.00	1.90			
14.25	1.70	0.00	1.70			
14.50	1.52	0.00	1.52			

SECTION 01570

ENVIRONMENTAL PROTECTION

PART 1 – GENERAL

1.01 DESCRIPTION:

- A. The work covered by this section of the specifications consists of furnishing all labor, materials, tools and equipment and performing all work required for the prevention of environmental pollution during and as a result of construction operations under this contract.
- B. The requirements set forth in this section of the specifications apply to construction in and adjacent to wetlands, unless otherwise specifically stated.
- C. All work under this Contract shall be in accordance with the Conservation Commissions' Orders of Conditions as well as any conditional requirements applied, all of which are attached to Section 00890, PERMITS.
- D. Prior to commencement of work, the Contractor shall meet with representatives of the Engineer to develop mutual understandings relative to compliance of the environmental protection program.

1.02 SUBMITTALS:

A. The Contractor shall submit for approval six sets of details and literature fully describing environmental protection methods to be employed in carrying out construction activities within 100 feet of wetlands or across areas designated as wetlands.

PART 2 - PRODUCTS

2.01 SILT FENCE:

- A. The silt fence shall consist of a 3-foot wide continuous length sediment control fabric, stitched to a mesh backing, and stapled to preweathered oak posts installed as shown on the drawings. The oak posts shall be 1-1/4-inches by 1-1/4-inches (Minimum Dimension) by 48-inches and shall be tapered. The bottom edge of the silt fence shall be buried as shown on the drawings.
- B. The silt fence shall be DOT Silt Fence PPDM3611, as manufactured by U.S. Silt & Site Supply/Getsco, Concord, NH, or approved equal.

C. Silt fence properties:

Physical Properties	<u>Test Method</u>	Minimum Value
Grab Strength, lbs.	ASTM-D-4632	124
Grab Elongation, %	ASTM-D-4632	15

Mullen burst, psi	ASTM-D-3786	300
Puncture, lbs.	ASTM-D-4833	65
Trapezoidal Tear, lbs.	ASTM-D-4833	65
UV Resistance2, %3	ASTM-D-4355	80@500 hrs.
AOS, US Sieve No.	ASTM-D-4751	30
Flow Rate, gal/min/sq ft	ASTM-D-4491	10
Permittivity, (1/sec) gal/min/sq ft	ASTM-D-4491	0.05 sec ⁻¹

2.02 STRAW BALES:

A. Straw bales shall consist of certified seed free stems of agricultural grain and cereal crops and shall be free of grasses and legumes. Standard bales shall be 14-inches high, 18- inches wide and 36- to 40-inches long tied with polypropylene twine and weigh within 5 percent of 7 lbs. per cubic ft.

2.03 CATCH BASIN PROTECTION:

A. To trap sediment and to prevent sediment from clogging drainage systems, catch basin protection in the form of a siltation sack (Siltsack as manufactured by ACF Environmental, Inc. or approved equal) shall be provided as approved by the Engineer.

2.04 COMPOST FILTER TUBES:

A. Silt socks shall be a tubular filter sock of mesh fabric. The fabric will have openings of between 1/8" to 1/4" diameter. The mesh material will either photo degrade within one year or be made of nylon with a life expectancy of 24 months. The sock shall be filled with a mix of composted leaf mulch, bark mulch and wood chips that have been composted for at least one year. The sock will have a minimum diameter of 12-inches.

PART 3- EXECUTION

3.01 NOTIFICATION AND STOPPAGE OF WORK:

A. The Engineer will notify the Contractor in writing of any non-compliance with the provisions of the Order of Conditions. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails to act promptly, the Owner may order stoppage of all or part of the work through the Engineer until satisfactory corrective action has been taken. No claim for an extension of time or for excess costs or damage incurred by the Contractor as a result of time lost due to any stop work orders shall be made unless it was later determined that the Contractor was in compliance.

3.02 AREA OF CONSTRUCTION ACTIVITY:

A. Insofar as possible, the Contractor shall confine his construction activities to those areas defined by the plans and specifications. All land resources within the project boundaries

and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction at least equal to that which existed prior to work under this contract.

3.03 PROTECTION OF WATER RESOURCES:

- A. The Contractor shall not pollute streams, lakes or reservoirs with fuels, oils, bitumens, calcium chloride, acids or other harmful materials. It is the Contractor's responsibility to comply with all applicable Federal, State, County and Municipal laws regarding pollution of rivers and streams.
- B. Special measures should be taken to insure against spillage of any pollutants into public waters.

3.04 CONSTRUCTION IN AREAS DESIGNATED AS WETLANDS ON THE DRAWINGS:

- A. Insofar as possible, the Contractor shall make every effort to minimize disturbance within areas designated as wetlands or within 100-feet of wetland resource areas.
- B. The Contractor shall perform his work in such a way that these areas are left in the condition existing prior to construction.
- C. The elevations of areas designated as wetlands shall not be unduly disturbed by the Contractor's operations.

3.05 LOCATION OF STORAGE AREAS:

- A. The location of the Contractor's storage areas for equipment and/or materials shall be upon cleared portions of the job site or areas to be cleared as a part of this project, and shall require written approval of the Engineer. Plans showing storage facilities for equipment and materials shall be submitted for approval of the Engineer.
- B. No excavated materials or materials used in backfill operations shall be deposited within a minimum distance of one hundred (100) feet of any watercourse or any drainage facility. Adequate measures for erosion and sediment control such as the placement of baled straw or line of straw wattles or compost filter tubes around the downstream perimeter of stockpiles shall be employed to protect any downstream areas from siltation.
- C. There shall be no storage of equipment or materials in areas designated as wetlands.
- D. The Engineer may designate a particular area or areas where the Contractor may store materials used in his operations.

3.06 PROTECTION OF LANDSCAPE:

A. The Contractor shall not deface, injure, or destroy trees or shrubs nor remove or cut them without written authority from the Owner. No ropes, cables, or guys shall be fastened to

or attached to any existing nearby trees for anchorages unless specifically authorized by the Engineer. Excavating machinery and cranes shall be of suitable type and be operated with care to prevent injury to trees which are not to be removed, particularly overhanging branches and limbs. The Contractor shall, in any event, be responsible for any damage resulting from such use.

- B. Branches, limbs, and roots shall not be cut except by permission of the Engineer. All cutting shall be smoothly and neatly done without splitting or crushing. When there is unavoidable injury to branches, limbs and trunks of trees, the injured portions shall be neatly trimmed and covered with an application of grafting wax or tree healing paint as directed.
- C. Where, in the opinion of the Engineer, trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or by his blasting or other operations, the Engineer may require the Contractor to adequately protect such trees by placing boards, planks, poles or fencing around them. Any trees or landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the expense of the Contractor. The Engineer will decide what method of restoration shall be used, and whether damaged trees shall be treated and healed or removed and disposed of under the provisions of Section 02230, CLEARING AND GRUBBING.
- D. Cultivated hedges, shrubs, and plants which could be injured by the Contractor's operations shall be protected by suitable means or shall be dug up, balled and temporarily replanted and maintained. After construction operations have been substantially completed, they shall be replanted in their original positions and cared for until growth is re-established. If cultivated hedges, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced by items of a kind and quality at least equal to that existing at the start of the work.

3.07 CLEARING AND GRUBBING:

- A. The Contractor shall clear and grub only on the Owner's land or the Owner's easements, and only the area required for construction operations, as approved by the Engineer. Removal of mature trees (4 inches or greater DBH) will not be allowed on temporary easements.
- B. The Contractor shall not remove trees in the Owner's temporary easements without permission of the Engineer.

3.08 DISCHARGE OF DEWATERING OPERATIONS:

- A. Under no circumstances shall the Contractor discharge water to the areas designated as wetlands.
- B. The pumped water shall be filtered through filter fabric and baled straw, a vegetative filter strip or a vegetated channel to trap sediment occurring as a result of the construction operations. The vegetated channel shall be constructed such that the discharge flow

rate shall not exceed a velocity of more than 1 foot per second. Accumulated sediment shall be cleared from the channel periodically.

3.09 DUST CONTROL:

- A. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of streets as necessary, to minimize creation and dispersion of dust. If the Engineer decides it is necessary to use calcium chloride for more effective dust control, the Contractor shall furnish and spread the material, as directed. Calcium chloride shall be as specified under Section 01562, DUST CONTROL.
- B. Calcium Chloride shall not be used for dust control within a drainage basin or in the vicinity of any source of potable water.

3.10 BALED STRAW:

A. To trap sediment and to prevent sediment from clogging drainage systems, baled straw shall be used where shown on the drawings. Care shall be taken to keep the bales from breaking apart. The bales should be securely staked to prevent overturning, flotation, or displacement. All deposited sediment shall be removed periodically. Straw bales shall not be placed within a waterway during construction of the pipeline crossing.

3.11 ERECTION AND MAINTENANCE OF SILT FENCE:

A. Where indicated on the drawings or where required by the Engineer, the Contractor shall erect and maintain a temporary silt fence. In areas designated as wetlands, the Contractor shall line the limits of the construction easement with a silt fence. The silt fence shall be used specifically to contain sediment from runoff water and to minimize environmental damage caused by construction.

3.12 CATCH BASIN PROTECTION:

A. Catch basin protection shall be used for every catch basin, shown on the plans or as required by the Engineer, to trap sediment and prevent it from clogging drainage systems and entering wetlands. Siltation sacks shall be securely installed under the catch basin grate. Care shall be taken to keep the siltation sacks from breaking apart or clogging. All deposited sediment shall be removed periodically and at times prior to predicted precipitation to allow free drainage flow. Prior to working in areas where catch basins are to be protected, each catch basin sump shall be cleaned of all debris and protected. The Contractor shall properly dispose of all debris at no additional cost to the Owner.

3.13 COMPOST FILTER TUBES:

A. The filter tubes will be staked in the ground using wooden stakes driven at 4-foot intervals. The wooden stakes will be placed at a minimum depth of 24-inches into the ground.

END OF SECTION

SECTION 31 12 00.13

SELECTIVE CLEARING, INVASIVE SPECIES

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. The work of this Section includes the following:
 - 1. Removal of selected living trees and removal of all dead, dying or diseased vegetation from within the project limits in accordance with the contract documents specifications.
 - 2. Removal of invasive species and undesirable undergrowth in accordance with these specifications.
- C. Prospective bidders are advised to complete a site visit to review the extent of work required and to confirm existing conditions, access issues, terrain and the general nature of the work of the Section.
- D. The Contractor shall coordinate invasive species removal with the Owner and Owner's Representative and shall adhere to the requirements set forth by the Town of Arlington Regulations, Town of Arlington Wetland Bylaws.

1.02 QUALIFICATIONS OF CONTRACTOR:

- A. This work shall be limited to individuals, partnerships and corporations who are actively engaged in the field of Invasive Species Management, and who demonstrate competence, experience and financial capability to carry out the terms of this project. Eligible contractors must derive a majority of their income from arboricultural work. The Owner may require proof of these qualifications.
- B. Any tree pruning that is required shall conform to Specification Section 31 13 13, TREE PRUNING AND TREE AND STUMP REMOVALS.

1.03 PERSONNEL:

A. Personnel requirements shall conform to Specification Section 31 13 13, TREE PRUNING AND TREE AND STUMP REMOVALS.

1.04 SPECIAL REQUIREMENTS:

- A. Trees: Invasive trees to be removed shall be those designated by the Owner's Representative/Arborist.
- B. Undergrowth: All plants less than 4-inches in diameter, measured at a height of 4 feet 6-inches above the ground, shall be classified as undergrowth. All invasive undergrowth shall be removed from areas shown on the plans, described in the special provisions, or designated by the Owner's Representative; except for those plants designated by the Owner's Representative to be preserved.
- C. General: When specified in the special provisions, stumps shall be treated with a herbicide immediately after cutting to prevent sprouting. The herbicide to be used, and the method and rate of application shall be as specified in the special provisions. The Contractor shall follow all applicable instructions, warnings, and safety precautions stated on the manufacturer's label, and shall comply with all laws and regulations governing herbicides that are in effect at the time of use. When work is performed properly in accordance with these specifications, no subsequent recutting of sprouts or seeding growth will be required. All trees and undergrowth cut shall be disposed of in accordance with the applicable requirements of Section 2.03 Demolition of these specifications.
- E. No burning shall be permitted on the project site.
- F. Prior to commencing work, the Contractor shall submit a plan to the Owner for legal disposal of removed materials, in conformance with State and Federal regulations.

1.05 STANDARDS AND DEFINITIONS:

- A. All standards and definitions shall conform to Specification Section 31 13 13, TREE PRUNING AND TREE AND STUMP REMOVALS.
- B. The Owner's Representative will monitor job progress throughout the project and approve all payments. A site walk will be conducted before work begins between the Contractor and the Owner's Representative. Specific trees, undergrowth and invasive species may be identified at this time for removal/eradication.

1.06 EXAMINATION OF SITE AND DOCUMENTS:

A. The Contractor shall be responsible for having a clear understanding of the existing site conditions and shall be responsible for fully carrying out the work of this Section, regardless of actual site conditions encountered.

1.07 ORDER OF WORK:

A. Order of work shall conform to Specification Section 31 13 13, TREE PRUNING AND TREE AND STUMP REMOVALS.

1.08 PROTECTION OF THE VEGETATION TO BE PRESERVED:

- A. Protection of the vegetation to be preserved shall conform to Specification Section 31 13 13, TREE PRUNING AND TREE AND STUMP REMOVALS.
- B. Any plants that are damaged to such an extent as to destroy their value for landscape purposes shall be cut and disposed of, and grass that is damaged shall be reseeded and remulched as necessary by the Contractor at no cost to the Town when so required by the Owner's Representative.
- C. The Contractor shall conduct his operations in such a manner to prevent injury to trees, shrubs, grass, or other types of vegetation that are to remain growing, and also to prevent damage to adjacent property.
- D. When any such injuries to trees or shrubs occur, broken branches shall be removed and rough edges of scarred areas shaped and made smooth in accordance with generally accepted horticultural practice.

1.09 USE AND CARE OF THE SITE:

A. The use and care of the site shall conform to Specification Section 31 13 13, TREE PRUNING AND TREE AND STUMP REMOVALS.

PART 2 - PRODUCTS

2.01 EQUIPMENT:

A. Equipment necessary for this Contract shall conform to Specification Section 31 13 13, TREE PRUNING AND TREE AND STUMP REMOVALS.

PART 3 - EXECUTION

3.01 TREE PRUNING AND REMOVALS:

A. The execution of tree pruning and removals shall conform to Specification Section 31 13 13, TREE PRUNING AND TREE AND STUMP REMOVALS.

3.02 INVASIVE SPECIES REMOVAL:

- A. For large invasive herbaceous and woody plant species, the Contractor shall excavate approximately four feet below the ground surface in order to remove the topsoil, the plant, and its root system and seeds in the soil.
- B. For the remaining invasive plant material, the Contractor shall apply the cut-and-dab method for invasive species removal. The plant shall be cut as close to the ground as possible. Herbicide shall be applied to the remaining cut surface of the plant as soon as possible after the plant is cut to increase effectiveness. The application of herbicide shall not take place when no rain is forecast for several days afterward to reduce the risk of treatment washing away. The Contractor shall ensure that seeds do not spread to any non-impacted areas and can achieve this by placing cut vegetation into bags.
- C. If plants are removed once flowering has begun, all plants must be bagged to contain seeds and disposed of at a legal facility.
- D. The extent of the invasive species plant material to be removed is delineated on the drawings.
- E. All equipment and clothing used during removal shall be cleaned to remove seed material before leaving the site and entering areas that do not contain invasive species.
- F. Cut and excavated materials shall be disposed of at a legal facility that accepts materials containing invasive species.

END OF SECTION

DRAFT APPROVAL ORDER OF CONDITIONS

51 Grove Street, DPW Renovation

DEP FILE NO. 091-0326

DOCUMENTS REVIEWED

- Department of Public Works (DPW) Facility Notice of Intent, Arlington, MA, prepared by Weston & Sampson, for the Applicant: Town of Arlington, Michael Rademacher, dated October 22, 2020.
 Appendices include: (A) Project Description, (B) Alternatives Analysis, (C) Stormwater Report, (D) Project Maps, (E) Project Specifications, (F) Abutters Information, and (G) Photos.
- Arlington Town Yard Facility, 51 Grove Street Arlington MA NOI Permit Plan Set, prepared by Weston & Sampson, stamped by Laurence F Keegan Jr PE #33708, dated October 21, 2020.
- 3. Arlington DPW Facility NOI Filing Supplemental Information, prepared by Weston & Sampson, dated November 24, 2020. Attachments include: (1) revised plan sheets C401 (Layout and Materials Plan) and C603 (Grading and Drainage Plan East), (2) Pre vs Post Flows Spreadsheet for NOAA + rainfall, (3) Pre vs Post Flows Spreadsheet for NOAA ++ rainfall, (4) Existing HydroCAD analysis for NOAA++ rainfall, (5) Proposed Existing HydroCAD analysis for NOAA++ rainfall, (6) Specification 01570 Environmental Protection, and (7) Specification 31 12 00.13 Invasive Species.

PUBLIC COMMENTS

4. Email from Sarah Tuttle, dated November 5, 2020.

PROCEEDINGS

The Notice of Intent was filed on October 26, 2020. The Conservation Commission opened the public hearing for the Notice of Intent on November 5, 2020. The hearing was continued with the Applicant's consent to the December 3, 2020. The Commission closed the hearing on December 3, 2020. The Commission deliberated on December 17, 2020 and voted XXXX to approve the Project with conditions under the Wetlands Protection Act (the "Act") and voted XXXX to approve the Project with conditions under the Arlington Wetlands Protection Bylaw (the "Bylaw").

FINDINGS OF FACT AND LAW UNDER ARLINGTON WETLANDS PROTECTION BYLAW AND WETLANDS PROTECTION ACT

- A. This project proposes a new/renovated Municipal Facility to support the Department of Public Works (DPW), Inspectional Services Department (ISD), Facilities, and IT departments at 51 Grove Street. The proposed site includes the current 4.4-acre parcel, used by DPW / ISD, and an adjacent 1.4-acre portion of Town-owned land for a total of 5.8 acres. Sections of the site are within the 100-ft Wetlands Buffer, AURA, and 200-ft Riverfront Area of Mill Brook, as well as floodway and floodplain. The project also involves mitigation including invasive plant removal and native replanting, landscaping, seven rain gardens/bio-filtration landscaped areas, and a new stormwater system with stormwater quality units.
- B. The Project site is located on Grove Street, immediately northwest of the High School. It is bound easterly by a National Grid natural gas facility and the Minuteman Commuter Bike Way. Westerly of the property are residences and a grocery store. North of the property, across Grove street, are residences and tennis courts. There are six existing buildings on the Public Works site. The Public Works property is approximately 5.8 acres and is predominately paved. The area that is currently being used as a field to the southwest of the buildings, is constructed over an area of contaminated soil and has an impermeable cap just beneath the surface, essentially rending the field area impervious as well. Site grades are generally flat. Running North to south through the property is Mill Brook. From the

DRAFT APPROVAL ORDER OF CONDITIONS

51 Grove Street, DPW Renovation

DEP FILE NO. 091-0326

property line at Grove Street, the Brook runs in a stone lined channel for approximately 37 feet, before entering a culvert. This channel is a regulatory floodway per FEMA mapping. From the end of the stone channel, the Brook enters a culvert. The culvert daylights at two locations on the property. Each of these openings and the area surrounding them are part of the 100-year flood zone per FEMA mapping.

- C. The following Resource Areas are present on the site or within 100 feet of the project area: Bordering Land Subject to Flooding, Adjacent Upland Resource Area, Buffer Zone, and Riverfront Area. The Commission finds accurate the delineation of Resource Areas shown on the approved Site Plans.
- D. The Commission approves those portions of the overall project that are within conservation jurisdiction as shown on the referenced plans (reviewed document #s 2 and 3).

CONCLUSION

Based on the testimony at the public hearings, and review of the application materials and the documents listed above submitted during the public hearings, the Commission concludes that the proposed Project as conditioned will not have significant or cumulative effects upon the interests of the Resource Area values of the Massachusetts Wetlands Protection Act and the Arlington Bylaw for Wetlands Protection when the conditions imposed herein are implemented to protect the Resource Area values. With these conditions contained, the Project meets the performance standards in the Act and Bylaw and implementing regulations.

For the foregoing reasons, the Commission approves this project under the Act and Bylaw with the conditions stated herein the applications for work at 51 Grove Street, the Arlington Department of Public Works Facility.

ADDITIONAL SPECIAL CONDITIONS

In addition to the General Conditions (numbered 1-20 above), the Project is subject to the following Additional Special Conditions (under both the Act and Bylaw) only for those portions of the project within the Conservation Commission's jurisdiction:

Pre-Construction

- 21. Work permitted by this Order and Permit shall conform to the Notice of Intent, the approved plans and documents (listed above), and oral representations (as recorded in hearing minutes) submitted or made by the Applicant and the Applicant's agents or representatives, as well as any plans and other data, information or representations submitted per these Conditions and approved by the Commission.
- 22. The provisions of this Order and Permit shall apply to and be binding upon the Applicant and Applicant's assignees, tenants, property management company, employees, contractors, and agents.
- 23. No work shall begin under this Order until: (a) all other required permits or approvals have been obtained and (b) the appeal period of ten (10) business days from the date of issue of this Order has expired without any appeal being filed, and (c) this Order has been recorded in the Registry of Deeds. No work shall be started under this Permit until all other necessary permits or approvals have been obtained
- 24. The Applicant shall ensure that a copy of this Order of Conditions and Permit for work, with any referenced plans, is available on site at all times, and that all contractors, site managers, foremen, and sub-contractors understand its provisions.

DRAFT APPROVAL ORDER OF CONDITIONS

51 Grove Street, DPW Renovation

DEP FILE NO. 091-0326

- 25. This permit and its conditions, and the referenced and approved site plans listed in this permit shall be included in all relevant bid materials.
- 26. Prior to starting work, the Applicant shall submit to the Commission the names and 24-hour phone numbers of project managers or the persons responsible for site work or mitigation.
- 27. Before work begins, erosion and sediment controls shall be installed at the limits of the work area.

 These will include a silt fence and minimum 12 inch straw or silt wattle compost filter sock around the entire work area (hay bales are not allowed and silt socks are preferred).
- 28. The contractor shall contact the Conservation Agent (concomm@town.arlington.ma.us; 781-316-3012) to arrange for a pre-construction meeting with the onsite project manager to walk through the Order of Conditions and walk the site to confirm the installation and placement of erosion controls prior to the start of any grading or construction work.
- 29. The contractor shall provide written Notice of the work start date to the Conservation Agent 48 hours prior to start of work.
- 30. The Commission, its employees, and its agents shall have the right of entry onto the site to inspect for compliance with the terms of this Order of Conditions and Permit until a Certificate of Compliance has been issued.
- 31. The Commission reserves the right to require an independent environmental monitor to monitor the project and report back to the Commission if it determines one is necessary at any time during the project's construction.

Post-Construction

32. When requesting a Certificate of Compliance, the Applicant shall provide a written statement by a registered professional engineer certifying substantial compliance with the plans and setting forth what deviation, if any, exists from the plans approved in the Order shall accompany the request for a Certificate of Compliance; the Applicant shall also provide at that time as-built plans stamped by such a professional.

Dumpsters

33. No dumpsters shall be allowed within the 100 foot Buffer Zone or Adjacent Upland Resource Areas ("AURA") or other Resource Areas.

Stockpiling

34. No uncovered stockpiling of materials shall be permitted within the 100 foot Buffer Zone or Adjacent Upland Resource Areas ("AURA") or other Resource Areas.

Erosion Control

- 35. Areas that are disturbed by construction and access activities shall as soon as possible be brought to final grade and reseeded and restabilized, and shall be done so prior to the removal of erosion control barriers.
- 36. Erosion control measures shall be installed per the approved plans.

Comment [KD1]: Committed to in NOI

DRAFT APPROVAL ORDER OF CONDITIONS

51 Grove Street, DPW Renovation

DEP FILE NO. 091-0326

37. At least 21 days prior to construction, a written dust mitigation plan using water as a dust control shall be submitted to the Conservation Commission. This dust mitigation plan shall be implemented through the duration of the project.

Equipment

38. No heavy equipment may be stored overnight within 50 feet of the brook and no refueling or maintenance of machinery shall be allowed within the 100-foot Buffer Zone, Adjacent Upland Resource Area, or within any Resource Area.

Sweeping

39. Any dirt or debris spilled or tracked onto any paved streets shall be swept up and removed daily.

Dewatering

- 40. Any dewatering operations shall conform to the following:
 - (a) Notify the Conservation Commission that dewatering is required.
 - (b) Any catch basins, drains, and outfalls to be used in dewatering operations shall be cleaned out before operations begin.
 - (c) Any water discharged as part of any dewatering operation shall be passed through filters, onsite settling basins, settling tank trucks, or other devices to ensure that no observable sediments or pollutants are carried into any Resource Area, street, drain, or adjacent property.
 - (d) Measures shall be taken to ensure that no erosion or scouring shall occur on public or private property, or on the banks or bottoms of water bodies, as a result of dewatering operations.

Plantings

- 41. All mitigation plantings and all plantings within resource areas and the buffer zone shall be native and be installed and maintained according to the standards of the American Association of Nurserymen (AAN). No cultivars of native plantings shall be allowed. This shall be a continuing condition that survives the expiration of this permit /Order and shall be included in any Certificate of Compliance as a continuing condition in perpetuity.
- 42. The Applicant is permitted to use the cut-and-dab method for invasive plant management control. The Applicant shall hire a licensed herbicide applicator with at least 3 years of experience. The Applicant shall only use Massachusetts Department of Environmental Protection approved herbicides.
- 43. All plantings planted and invasive species removed through this project shall be monitored for three years. A survival rate of at least 80% must be maintained for the approved plantings at the end of the third monitoring year. If there is less than an 80% survival rate of the plantings after the third year, the Applicant must submit recommendations for replacements to the Conservation Agent for approval. A monitoring report shall be submitted annually in June for the three year monitoring period, reporting on the health of the new plantings and the success of the invasive plant management.
- 44. The Applicant shall notify the Conservation Agent when the invasive removal and planting work along Mill Brook is scheduled so that the Conservation Agent can monitor the work.
- 45. The Applicant shall protect all area trees per the Town Wetlands Protection Regulations, Section 24 Vegetation Removal and Replacement, protecting trees through securing (not nailing) 2x4 boards, between 6-8 feet in length, around tree base. The boards shall be installed vertically such that one end

DRAFT APPROVAL ORDER OF CONDITIONS

51 Grove Street, DPW Renovation

DEP FILE NO. 091-0326

is installed directly into the ground. Alternative protection measures must be approved by the Commission or its agent.

Chemicals

46. To avoid adding excess nitrogen runoff, the Applicant shall only treat the planted areas within the Commission's jurisdiction with slow release nitrogen fertilizer. Application of this fertilizer cannot occur in the summer, or after storm events. Lawn fertilizer shall only be applied twice a year, in spring and fall. The application of plant nutrients shall otherwise comply with 330 CMR 31.00. No other herbicides or treatment methods are approved unless otherwise noted in this order (see Condition #42). New plantings shall only be fertilized once, during the initial planting year. No pesticides or rodenticides shall be used to treat pest management issues within the 100-ft wetlands buffer, AURA, or other resource areas without prior notification to and review by the Conservation Agent. This shall be a continuing condition that survives the expiration of this permit /Order and shall be included in any Certificate of Compliance as a continuing condition in perpetuity.

Pervious Surfaces

- 47. Pervious surfaces shown on the project plans shall be maintained and not be replaced by impervious surfaces. This shall be a continuing condition that survives the expiration of this permit /Order and shall be included in any Certificate of Compliance as a continuing condition in perpetuity.
- 48. All mitigation as proposed as part of this project shall remain in perpetuity. The approved planting areas, invasive removal areas, the rain gardens, the water quality units, and the stormwater system shall remain in perpetuity and if replacement is necessary, shall be subject to the approval of the Commission. This shall be a continuing condition that survives the expiration of this permit /Order and shall be included in any Certificate of Compliance as a continuing condition in perpetuity.

Stormwater

- 49. The Applicant shall submit an annual affirmation that a contract with a third party contractor for maintenance of the underground storage chambers and approved water quality units is in place, which shall include the dates of their last service. All other structural stormwater BMPs shall be maintained in accordance with the approved Operation and Maintenance plans. It is sufficient to email the Conservation Agent with a statement of affirmation, and the statement must be submitted by December 31 each year. This shall be a continuing condition that survives the expiration of this permit /Order and shall be included in any Certificate of Compliance as a continuing condition in perpetuity.
- 50. The Applicant shall submit copies of the SWPPP inspection reports to the Conservation Agent within 10 days of the date of each report.
- 51. The Applicant shall submit a snow storage plan to the Commission for review. No snow storage is permitted in the mitigation planting areas or within any resource areas. This shall be a continuing condition that survives the expiration of this permit /Order and shall be included in any Certificate of Compliance as a continuing condition in perpetuity.
- 52. The Applicant shall coordinate with the Arlington High School on stormwater management in order to improve climate change resilience and preparedness.